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SPECIAL REPORT: IS IN THE 1990s

COMPUTERWORLD

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Database pace: Oracle previews its next release, while Sybase touts an interface to open up DBMS options. Stories, page 4.

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Medics diagnose information systems in Mayo Clinic decision-making process. Page 79.

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Olsen succession outlook murkier than ever as former heir apparent bails out of DEC. Page 4.

Cray pares work force, citing manufacturing efficiencies. Page 8.

Can the AS/400 get any easier? Apparently so — if you want to pay IBM to set it up and keep it running. Page 14.

DEC winds up All-In-1 office pitch

BY ELISABETH HORWITT
CW STAFF

NEW YORK — Digital Equipment Corp. is expected to unleash its counterpunch to IBM's recent Officevision introduction tomorrow — a next-generation office information system that will combine a renovated All-In-1 with a beefed-up client/server architecture based on DEC's Network Application Support.

The vendor will announce All-In-1 Phase 2, the latest version of the host-based software system, which will incorporate an object-oriented structure and a Decwindows-based interface, according to Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. The object-oriented structure will be announced just a week after DEC introduced an object-oriented

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Welcome mat out for 486 chips

Despite cost and software lag, users eye server, number-crunching power

BY PATRICIA KEEFE
CW STAFF

So what if software, as usual, lags behind the leading edge of Intel Corp.'s desktop technology? Users interviewed last week ticked off multiple situations in which they expect to take immediate advantage of the Intel I486 chip's primary benefit — hair-raising speed, and plenty of it.

Last week's delivery of the first I486-based offering, an add-in card from IBM (see story page 39), was the starting gun for hardware vendors racing to bring turbocharged desktop computing to market. Comdex/Fall '89, slated for next month in Las Vegas, is expected to bring a torrent of next-generation hardware introductions.

At 15 million to 20 million instructions per second, a 486 machine could become the standard for low-end workstations. However, as a personal productivity tool, "the pricing is pretty exorbitant," said Kingsley Mar, a senior systems analyst at Wells Fargo Bank in San Francisco. Mar said he has previewed four 486 systems and is planning to anchor his networks with 486-based file servers.

The initial estimated sticker price of $10,000 to $15,000 for I486-based computers is bound to put off some microcomputer strategists. Nevertheless, early implementors — an estimated 10% of the user population — are targeting the following areas for 486 processing power:

- High-speed file servers anchoring networked 386 workstations.
- Processing-intensive applications such as various financial applications, graphics, computer-aided design and manufacturing and systems development.

To a lesser degree, the 486-based boxes will also serve to turn up the heat on workstation vendors that have been targeting the personal computer market with cut-rate prices and minicomputer vendors that are positioning low-end systems as local-area network servers, analysts said.

At Allstate Insurance Co. in Northbrook, Ill., preliminary tests of IBM's 486/25 Power Platform add-in board running in IBM's Personal System/2 Model 70-A12 produced a "significant differential" in performance

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Chips 'n Mips

Systems using the Intel 486 will be able to utilize greater CPU performance and a built-in coprocessor

	386SX	386DX	I486
Clock speeds (MHz)	16	16, 20, 25, 33	25, 33
Performance (MIPS)	2.5 - 3.0	4 - 8	15 - 20
Address bus	24 bit	32 bit	32 bit
Data bus	16 bit	32 bit	32 bit
Physical memory	16M bytes	4G bytes	4G bytes
Numerics coprocessor	80387SX	80387	On-chip

SOURCE: INTEL CORP. CW CHART: JOHN YORK

IBM retunes DB2 upgrade

BY ROBERT MORAN
CW STAFF

When IBM delivered DB2 Version 2, Release 2 three weeks ago, it surprised users and analysts by packing in more transaction and query performance than was promised when it was announced last year.

The release, which became available Sept. 22, costs approximately 5% more than IBM initially stated when it announced the product Oct. 4, 1988.

Norris van den Berg, IBM's manager of data systems architecture and strategy, said the price increases were the result of a 5% cost increase that went into effect July 1 for the MVS products.

Users and analysts welcomed DB2's distributed capability and transaction performance boosts but were skeptical about its purported increases in query processing performance.

According to IBM, the new release performs query processing up to 10 times faster than its predecessor, Release 1, while requiring five times less CPU time. Transaction performance has been improved by 7% in CICS pool transactions per second and up to 11% for IMS Non-

Continued on page 121

Disk Killer came in the front door

Disk Killer Version 1.00 by Ogre Software, April 1, 1989. Do not turn off the power or remove the diskette while processing!

BY MICHAEL ALEXANDER
CW STAFF

If that message pops up on the screen of your IBM Personal Computer or clone, it is already too late.

One-third of your hard disk drive will have undergone a low-level format, wiping the hard disk's boot sector clean of partition and file allocation tables. Wait a few seconds more and the entire disk with all of its programs and data will have been deleted.

Even with some of the best file-recovery utilities available today, you will probably not be able to retrieve your data, said end users who have encountered the virus.

To complicate matters, it may be futile to follow many of the oft-suggested procedures for warding off viruses. Some users said their systems were infected after using commercially available software.

The virus' origin is still unknown, but it is believed to have been concocted at least six months ago. Already, it appears to have spread widely. Reports of Disk Killer have surfaced in Washington, Nebraska, Minnesota and California, for example.

The problem of computer viruses has reached epidemic proportions, according to several computer security experts (see story page 6). Most of them

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Spreading plague

- Individual viruses expected to hit few machines, but new strains are on the rise. Page 6.
- Friday the 13th came early in Philly: College networks sapped by bug. Page 6.
- Security agencies urge calm and issue precautions. Page 46.

NEWSPAPER

SECOND CLASS

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120 Users tooling along with CASE had better be prepared for budget bloat.

Quotable

"We used to be a real high-tech shop . . . Now I spend more money training the staff about the business than I do about IS."

BOB EVANS
EL PASO NATURAL GAS

Looking toward the IS environment of the 1990s. See story page SR/23.

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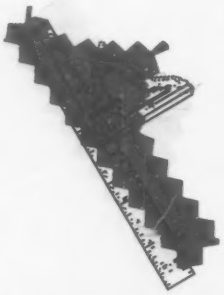
UPDATE

Learn 'em about big business. A broad study of employee involvement within the Fortune 1,000 by a group of USC researchers revealed that increased involvement via quality circles and the like can have a potent impact on a company's effectiveness and global competitiveness. However, the study said that woefully few firms have started to train workers to understand such U.S. business fundamentals as financial reports and business dealings. You can start their education in basic business by explaining how Donald Trump can personally launch a $8 billion attempt to take over American Airlines. Good luck!



The right tool for the right software job. Page 83.

ALVIS UPITIS

Caring for the Mayo Clinic's information systems requires patience, perseverance and political skills. Page 79.

EXECUTIVE BRIEFING

■ **The next decade will chart a challenging course** both for businesses and information systems organizations. Experts predict a murderous business climate in which product cycles and decision intervals will shrink as companies scramble to keep up with changing markets and competition. Information technology will play a critical role in enabling businesses to keep up, meaning IS executives need new skills in organizational design, change management and human relations. However, don't expect much more funding to fight the battle. **See Special Report in this issue, after page 62.**

■ **It's called Disk Killer,** it's possibly the most destructive personal computer virus ever unleashed, and it has been reported as having caused data damage in four states. Woe is he who finds the Disk Killer message on his screen. **Page 1.** However, computer security experts are urging calm in the face of the two widely hyped viruses of particular interest this week: the Columbus Day and Friday the 13th strains. **See stories on page 6 and page 46.**

■ **Former Quaker Oats IS chief Ron Brzezinski** is heading to the Big Apple for a return to the consulting profession. He starts today as a partner in Coopers & Lybrand's information technology practice. **Page 8.**

■ **People, not technology tools,** are the key to CASE success. Speakers and attendees at a CASE Research conference in Monterey, Calif., say that vendors' productivity promises are moot if programmers do not buy into the concept. But they were optimistic that IBM's AD/Cycle will help by defining standards. **Page 31.** Nonetheless, the cost of CASE remains a barrier. A Touche Ross survey finds that the average total IS budget of CASE users is three times as large as those of nonusers. **Page 120.** Meanwhile, DEC expanded its CASE offerings with its answer to AD/Cycle. **Page 120.**

■ **IS must seize the day** and take a business leadership role, a senior business executive from MCI told attendees at the SIM annual conference. Senior Vice-President Douglas Maine stirred many emotions by detailing IS shortcomings of the past and present. **Page 80.**

■ **When is a PC not a PC?** When it's a workstation. High-powered PCs such as Apple's Mac IICI and such entry-level workstations as the Apollo 2500 have made the distinctions increasingly blurry. **Page 39.**

■ **Both autumn leaves and computer industry employees are falling fast.** Unisys, IBM and Motorola have joined the swelling ranks of vendors who have announced layoffs, early retirement plans and other pruning measures. **Page 93.**

■ **IS professionals changing jobs** might check out online services that carry listings and advice. Some headhunters run bulletin boards aimed at job hunters. Even more popular are job postings and career discussions on sections of such general services as Compuserve that are frequented by computer professionals. **Page 102.**

■ **On site this week:** Northwest Airlines is the first U.S. carrier using a supercomputer for flight plan scheduling. A Convex C220 makes the scheduling more efficient and saves Minneapolis-based Northwest millions in pay for nonflying hours. **Page 29.** If any of those Minnesotans are angling enthusiasts, electronic data interchange may be helping them get their fishing gear faster. Fairfield, N.J.-based Abu Garcia, U.S. distributor for AB Urfabriken of Sweden, is using EDI for better service to more than 2,000 retail outlets. **Page 34.**

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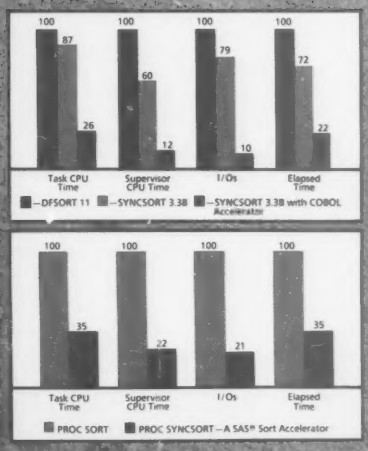

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Oracle previews next release

BY JEAN S. BOZMAN
CW STAFF

DALLAS — Oracle Corp. executives last week demonstrated Version 7.0 of its relational database management system — a product that will not even be announced until next year.

That development surprised many of the 3,600 users at the International Oracle Users Group meeting, as most have yet to install Oracle Version 6.0.

The premature showing was designed to whet users' interests in the referential integrity and distributed database features of the next release, according to Oracle Chief Executive Officer Larry Ellison. "The development of Version 7.0 is complete," Ellison told users. "We hope to deliver it on time at the end of next year."

During another session with users, however, Ellison conceded that the company has experienced problems with Version 6.0 for Digital Equipment Corp. Vaxclusters.

Ellison said that Version 6.0 code with the Transaction Processing Option (TPO) sometimes causes machines in a Vaxcluster to "thrash" when paging and swapping to disk becomes too intense. Version 6.0 without TPO is not scheduled to ship until later this month.

"We were not able to scale up on the performance curve the way we would have liked to," Ellison said. "So we went back to the labs, and we are continuing to tune our VAX code."

Despite those problems, Ellison termed Version 7.0 "the full realization of a two-year goal" to include referential integrity in Oracle's core product. In contrast, Version 6.0 was, he said, an attempt to solve concurrency problems as large numbers of users logged on to a system.

Many users expressed surprise at Oracle's timing of the preview, saying that their top priority is to migrate from Version 5.0 to Version 6.0.

"We're happy with what we've got right now," said David Lingo, a systems analyst with the Air Force Logistical Command at Wright Patterson Air Force Base in Dayton, Ohio. A move to Version 6.0, while not immediate, is planned, Lingo said.

Oracle's Ellison *wants to tempt users*

However, other users said they welcomed the chance to see Version 7.0. "I'm really looking forward to Version 7.0," said Rick Stahlhut, a data manager at Boston Children's Hospital. "In the past, Oracle has made references to ship dates that didn't pan out. But I feel confident that it was a real demo of Version 7.0."

Oracle executives painted broadbrush pictures of Version 7.0. "It will be the world's first true distributed database management system, with two-phase commit, multisite query and update and transparency in the network," Ellison said.

SQL Server update boasts openness

BY AMY CORTESE
CW STAFF

NEW YORK — Sybase, Inc. raised the ante last week for database vendors that want to play in the open market with new and enhanced products designed to facilitate database-to-database communications.

Billing it the "first open relational DBMS," Sybase announced a new version of the Sybase SQL Server and a server interface that the firm will push as a standard programming interface.

The interface, Open Server, acts as a buffer on the server side of a client/server architecture, shielding users and applications from the specific data and services they are using. For instance, non-Sybase data and services would be treated the same way as Sybase data. In fact, Sybase officials said the Open Server would allow Sybase to be replaced as the server without disrupting operations.

The firm hopes to garner industry support for its new Open Server and existing Open Client interfaces as industry standards for client/server communications. As part of this effort, Sybase initiated a program to license its server interfaces along with the communications protocol between the interfaces. It has also submitted the technology to the Open Software Foundation as a possible interoperability standard.

However, it remains to be seen how successful Sybase will be with its bid. There are several vendors with products that work with Sybase's client interface, including Ashton-Tate Corp., Lotus Development Corp., Microsoft Corp., Novell, Inc. and Tandem Computers, Inc., but as yet there are none signed up for the Open Server.

"Sybase is not alone in trying to push the market in the necessary direction," said Peter Kastner, a vice-president at Cambridge, Mass.-based Aberdeen Group. However, Kastner maintained that vendors will have to cooperate on coming to agreement: "This is an area that calls for a peace conference."

Version 4 is in production release for Sun Microsystems, Inc. platforms and will be available on all other Sybase platforms by the first quarter of 1990, according to the firm. Initial license fees range from $3,000 to $192,000.

Former No. 2 DEC man leaves firm

BY NELL MARGOLIS
CW STAFF

MAYNARD, Mass. — One of the industry's most persistent rumors gelled into fact last week when Digital Equipment Corp. Senior Vice-President John J. (Jack) Shields resigned from the firm that many feel he helped shape into the world's second-largest computer company.

Shields, whose 27 years at DEC saw him rise from field service engineer to the head of the company's then-burgeoning international sales and services organization, until recently was widely regarded as the man most likely to succeed founder and President Kenneth Olsen.

Analysts said his departure, pegged by a company statement as being for personal reasons, focused attention on the succession issue that Olsen apparently would prefer to contemplate in private, if at all.

Whether Shields ultimately dealt himself out of DEC or whether the impetus came from Olsen is a matter on which analyst speculation divides. However, all agree that the 51-year-old executive's exit has been in the cards since at least last spring, if not longer.

Shields

In particular, said John Logan, an analyst at Aberdeen Group, a Boston-based market research firm, Shields' stature sustained damage when two service-driven events converged last year.

Shields, Logan said, "put into place a new customer support agreement that was interpreted by customers as a price increase. Second, a large number of customers let Olsen know that they weren't getting the level of service they expected."

Despite several highly praised product introductions, DEC's last year has been a grueling saga of sluggish sales, an 18% decline in profits and shrinking stock value.

Last January, Shields' day-to-day U.S. sales and marketing command was shifted to Canadian-born David Grainger. The promising 46-year-old executive rocketed to the top of several analysts' lists of probable Olsen successors.

Other pieces of Shields' turf — "whole departments," Logan said — were moved to the power base of Senior Vice-President Jack Smith, keeping Smith's name green in the succession sweepstakes. Once seen as holding power second only to Olsen's, Shields spent his last months at the company as "one of the walking dead," said Terry Shannon, who follows DEC at Framingham, Mass.-based market research firm International Data Corp.

While many saw Shields' exit as inevitable, not all viewed it as fair. "Shields was pilloried for DEC's weaknesses against IBM and Sun," Shannon said. It was Shields, Shannon said, who exploited the profit-center potential of services at the traditionally technology-centered company — a shift in emphasis that has been cited repeatedly as key to DEC's continued might.

Some analysts speculated that Shields' departure was prompted not as much by his failure to turn around DEC's sales as by his plans to do so through marketing advances that went down poorly with Olsen.

Neither Olsen nor Shields was available for comment.

COMPUTERWORLD

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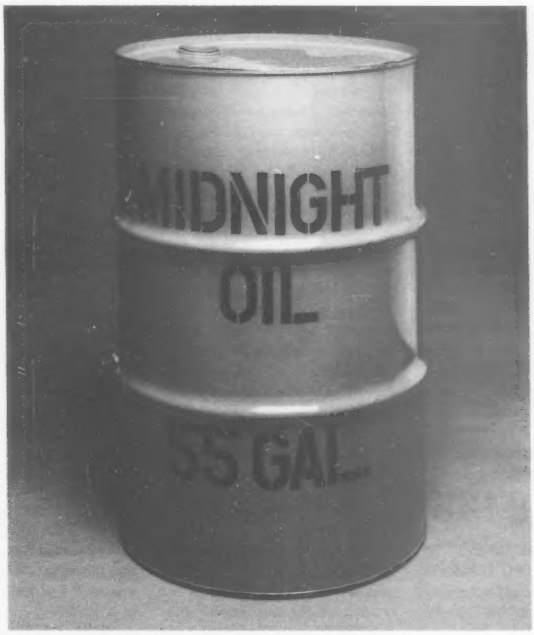

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Huntsville	October 11 C	Atlanta	November 15 C	Jackson	November 14 C	Research Triangle Park	October 26 P	Columbia	October 19 C
CALIFORNIA		Macon	October 10 C	MISSOURI		OHIO		TENNESSEE	
San Francicso	October 26 C	ILLINOIS		St. Louis	October 10 C	Cincinnati	November 14 P	Nashville	October 24 C
Santa Clara	November 21 C	Chicago	October 25 C	NEW JERSEY		OKLAHOMA		TEXAS	
COLORADO		MARYLAND		Saddlebrook	October 19 P	Oklahoma City	November 15 C	Austin	November 3 C
Denver	October 19 C	Baltimore	October 17 C	NEW YORK		OREGON		Dallas	November 7 P
CONNECTICUT		MASSACHUSETTS		Albany	October 11 C	Portland	November 9 C	Houston	October 19 P November 16 C
New Haven	October 12 P	Worcester	November 1 P	Buffalo	November 9 C	PENNSYLVANIA		San Antonio	November 2 C
FLORIDA		MINNESOTA		Melville	October 18 P	King of Prussia	October 13 C	WISCONSIN	
Miami	November 9 C	Minneapolis	October 11 C	Rochester	October 19 C			Milwaukee	October 24 C

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Virus outbreaks not so bad, but will get worse

BY MICHAEL ALEXANDER
CW STAFF

The good news is that there is no need to panic about the Columbus Day and Friday the 13th computer viruses reportedly primed to hit personal computers Thursday and Friday this week.

The bad news is that viruses have become so prevalent that every day is Columbus Day, Friday the 13th — and more — rolled into one, according to several information systems security professionals.

What is more, recently introduced strains of computer viruses are more slickly programmed and more insidious than ever before (see story page 1), the experts concluded.

The Columbus Day virus is relatively new and thus has not spread widely. Experts believe it was devised last March by a European programmer.

"We have been swamped by calls for information about the Datacrime virus," said John McAfee, president of the Computer Virus Industry Association (CVIA). "But I'll bet 100-to-1 odds that we are not going to have 10 verified reports of the Columbus Day virus. It is not a statistically prevalent virus."

"This event is being overblown," said Sanford Sherizen, a Natick, Mass.-based computer crime prevention consultant. "I am more worried that even if there was no Datacrime, there is sure going to be one now." The Friday the 13th virus, however, is believed to have been concocted in 1987, apparently as a protest against the 40-year anniversary celebration of the founding of Israel held in May 1988.

Today, the virus occurs in several variations and is liable to crop up on any day (see story above). It is by far one of the most prevalent viruses in existence, McAfee said.

The CVIA logged 904 telephone calls between July 15 and Sept. 15 from individuals who claimed to have personal computers infected by a virus. Further investigation indicated that as many as 36,700 machines (out of 75,000 machines believed to have been hit) had been infected with the Friday the 13th virus or one of its variations in the same three-month period.

No one is sure how widespread viruses are, but many experts in the computer security and law enforcement fields agree that the problem is several times worse this year than last.

The problem of viruses will become more acute, Sherizen said. The programs that have surfaced recently are more destructive and more difficult to detect than ever before, he added.

In addition, some programmers are vying with one another to see who can write the most destructive virus with the least amount of code.

"I predict that someday we'll look back on the days of the virus and say that those days were not so bad compared to what we have now," Sherizen said.

Killer

FROM PAGE 1

are believed to have originated in Europe and are often more of a nuisance than anything else, according to John McAfee, president of the Computer Virus Industry Association.

However, a disturbing trend has been under way in recent months: Four or five of the latest viruses appear to have been created in the U.S. and are the most destructive yet, McAfee said. "The Disk Killer is the worst one going around now," he said.

It is being called one of the most insidious personal computer viruses ever devised, according to computer experts and those whose machines have been infected.

"Its sole intent is to cause misery," said Fletcher Johnson, a programmer at Birchwood Systems, Inc., a custom software programming firm in San Jose, Calif. Two of the company's machines were hit by the virus recently. Disk Killer is cleverly contrived and designed to make recovering files difficult if not impossible, Johnson said. "It is much more insidious than any I have ever seen," he said.

It took Jim Hunter a week to figure out that his new PC, which he bought at a local computer dealer in a suburb of Minneapolis, had been infected by Disk Killer. After ridding his system of the virus, Hunter discovered it had entered his system on a diskette of utilities that had been bundled with his machine. The PC and utilities were distributed by Wedge Technologies, Inc., a San Jose, Calif., clone maker.

Wedge Technologies believes it picked up the virus a few weeks ago, along with programs that had been downloaded from a bulletin board, according to Steven Lee, supervisor of service at the company.

They were rubbing their eyes

Friday the 13th arrived in Philadelphia earlier than expected, at least for IS personnel at the Pennsylvania College of Optometry.

In September, the college was hit by the Friday the 13th virus, which ultimately led to the shutdown of roughly 20 personal computers on two local-area networks. The virus was carried into the accounting department of the school in a public-domain program called K.Com, which generates kaleidoscopic displays. "My boss ran it on my machine while I was logged onto the network," said Anthony Wlodarczyk, a programmer who is also responsible for supervising the accounting department's LAN.

Some days later, rectangular blocks of text and graphics, about 1½ by 2 inches, began disappearing from the left side of the screen on PCs that had been turned on for a half hour or so, Wlodarczyk explained. Soon after, the PC processing speed began slowing to about half.

IS staffers did not suspect that a virus was at the root of their problem but were baffled at what could be the cause. Finally, they called in an independent consultant who was able to determine that the problems were indeed being caused by a computer virus. That was not before the virus had infected diskettes used by the consultant, who then transported the virus to another LAN on campus and infected its PCs.

The tab to find and remove the virus topped $5,000 and severely hampered productivity for more than a week, Wlodarczyk said. "We're wiser now," he said. The college purchased a virus detection program called Vi-Spy, published by RG Software Systems, Inc. and has instituted policies that regulate the use of any software on the networks.

MICHAEL ALEXANDER

Stratus breaks from fault tolerance

BY MARYFRAN JOHNSON
CW STAFF

MARLBORO, Mass. — Breaking away from its nine-year tradition of fully fault-tolerant computing, Stratus Computer, Inc. last week introduced a low-end model offering only limited protection from failure at bargain-basement prices.

The XA2000 Model 30, priced from $37,000 to $49,800 depending on various options, is the first Stratus system to offer customers different levels of fault tolerance and the promise of Unix early next year.

It is also the opening volley in Stratus' assault on a broader marketplace. Stratus President William Foster said he wants to expand beyond corporate headquarters to "where the business actually takes place" — in branch offices and remote sites of banks, stores, warehouses and brokerage firms.

"This is a new competitive arena for Stratus," Foster said.

"It's just like Burger King: Fix it the way you like it," said David Wu, an industry analyst at S. G. Warburg and Co. in New York. "The price point is very critical. And that ability to expand the system over time is very desirable to businesses."

On all other Stratus systems, each hardware component is duplicated by an identical partner. The no-frills version of the Model 30 duplicates only the power supply, although the single-processor board contains dual microprocessors for error detection.

Customers can upgrade the basic system by adding other duplexed components such as the $5,800 8M-byte memory board or the $4,000 I/O processor, on up to the fully fault-tolerant model that includes duplicate processor boards.

But why would a company with a reputation and product line based on never-fail computers offer a product that could do just that?

"The primary focus of the Model 30 was price," Foster said, noting that typical Stratus systems cost $500,000 or more. "The low-end market is more price-sensitive, and a few thousand dollars can make the difference in a sale." Smaller systems also have fewer parts to break down, he added, and tend to do less intense computing work.

The Model 30s are available only to major customer sites now, with full production and shipping expected next January or February, company officials said.

Power down

Downsized Stratus entry-level system lowers price barriers

	XA2000 Model 30	XA2000 Model 50
Introduced:	Oct. 1989	Jan. 1988
Entry price:	$37,000-49,800	$79,000
Performance:	9 ET-1 trans/sec.	10 ET-1 trans/sec.
Maximum memory (physical)	32M bytes	16M bytes
CPU Type:	Motorola 68030; uniprocessor	Motorola 68010; multiprocessor
Coprocessor:	Motorola 68882 floating-point processor	None

SOURCE: STRATUS COMPUTER, INC. CW CHART: JOHN YORK

Tandem adding to high end

BY J. A. SAVAGE
CW STAFF

Next week, Tandem Computers, Inc. plans to unveil its Cyclone high-end transaction-processing system.

Initially expected to debut this summer, the computer was delayed while Tandem worked out its operating system, C20, according to a source in the company.

"A lot of new functions were deferred to coincide with C30 [the next operating system version], due a year from now," said John Jones, an analyst at Montgomery Securities in San Francisco. He added that the C20 system has been running at some large accounts and appears to be healthy.

The computer will operate at more than 100 million instructions per second, said Jimmy Treybig, company president, in an interview last summer. No new information was officially available from Tandem, but one source at the company said that each processor on Cyclone will double the current I/O channels from two to four.

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11-CW-85-0102

NEWS SHORTS

Current RT line on the outs

Although IBM has still not given official word on when its next-generation RT workstation family will be unleashed, the firm indicated last week that the life of its current RT line is drawing to an end. A migration program allowing current RT customers a trade-in allowance when purchasing next-generation RTs will credit customers for up to 80% of the initial cost of the older machine and "associated peripheral devices and features that cannot be used in the second-generation RISC machine."

Qu'est-ce que c'est?

Covia Corp., the travel distribution company owned by United Airlines and other carriers, claimed a first when it announced that its Apollo computer reservation system will offer several foreign language itinerary capabilities. Using the system, travel agents can produce itineraries in French, Spanish, German, Italian, Polish, Dutch, Hungarian and Portuguese as well as English.

Glenn urges DARPA-like agency

Sen. John Glenn (D-Ohio) last week proposed a civilian counterpart to the Defense Advanced Research Projects Agency that would provide government seed money for high-technology research. Other supporters of the proposed Advanced Civilian Technology Agency are Reps. Richard A. Gephardt (D-Mo.), Mel Levine (D-Calif.) and Sander M. Levin (D-Mich.).

IBM shops again

IBM last week expanded its reach into the geographic information systems (GIS) market with the acquisition of an equity interest in Geographic Systems Corp., based in Green Bay, Wis. The company provides GIS software and services for municipal and utility clients.

Vendors follow federal lead

Several companies introduced products at Interop 89 last week that implement the simple network management protocol (SNMP). Advanced Computer Communications, Cabletron Systems, Inc., Excelan, Inc., and Synoptics Communications, Inc. announced network management software, gateways and bridges based on the protocol. The U.S. government recently mandated SNMP as the network management protocol of choice for federal procurement.

Concurrent makes OSI intro

Concurrent Computer Corp. will jump into the open systems spotlight with its announcement today of nine connectivity products. The RTnet line includes four value-added Open Systems Interconnect (OSI) products that link the vendor's Series 3200 and 5000/6000 series processors with computers from Digital Equipment Corp. and Sun Microsystems, Inc.

DEC paves a path

Meanwhile, DEC announced products designed to smooth the migration path from existing Transmission Control Protocol/Internet Protocol (TCP/IP) installations to the OSI-compliant Decnet Phase V. DEC said the Internet Portal connects TCP/IP devices to a Decnet/OSI backbone, while the Decnet/Internet Router 2000 software routes both TCP/IP and Decnet protocols over the same OSI backbone network.

Support comes in a flash

Microsoft Corp. last week announced support for Intel Corp.'s flash memory technology, saying it will license a flash file system in binary form to OEMs. Intel's flash memory reportedly provides a 50% lower cost per bit than equivalent static RAMs. The Flash File System allows MS-DOS to support new memory storage devices as well as traditional storage media. It is said to be a strong complement to ROM-executable MS-DOS, particularly for portable and notebook desktop computers.

Cray layoffs reflect competitive era

BY JAMES DALY
CW STAFF

MINNEAPOLIS — Approximately 400 assembly workers at Cray Research, Inc. found themselves on the losing end of the high-tech revolution last week when the company announced that streamlined manufacturing methods will result in the first major layoff in the firm's 17-year history.

The cuts will be made from among the 2,800 workers at the Rice Lake and Chippewa Falls, Wis., manufacturing plants, with all departures expected to occur by the end of the month, Cray officials said.

Cray cited several reasons for the dismissals, including the discontinuation of the X-MP line. The successive Y-MP uses a new integrated circuit that requires fewer parts and thus fewer workers to assemble. The Y-MP's central processor is packaged as a single module, reducing the manual assembly steps.

"Technological advances move as fast, if not faster, than ever before, and we must embrace these technologies to remain competitive," Cray Chairman John Rollwagen said. "We deeply regret the disruption this will bring to the lives of those affected."

In recent years, Cray has been squeezed by both internal and external pressures that have resulted in flattened profit lines. Japanese firms such as NEC Corp. and Fujitsu Ltd. are rapidly developing powerful machines designed to take a bite out of Cray's lion's share of the worldwide supercomputer market.

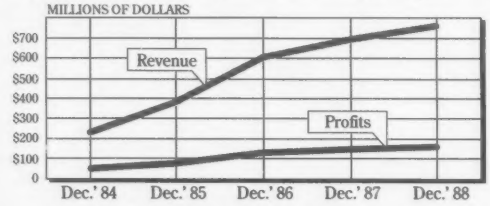
The high cost of research and development has also hurt Cray. In mid-May, the firm moved to soften the wallop of R&D costs, announcing a restructuring plan that would split it into two technological camps [CW, May 22].

Initially, employee cuts will come on a voluntary basis, with involuntary termination to begin near the end of the month.

Although the cost of the layoff is expected to be around $3 million, a Cray spokesman said the rollbacks should save the firm $10 million within a year.

Growing pains

Cray Research, Inc.'s growth has slowed down in the past two years



CW CHART: FRANK C. O'CONNELL

Ex-Quaker Oats exec restarts consulting life

BY CLINTON WILDER
CW STAFF

NEW YORK — Former Quaker Oats Co. information systems chief Ronald Brzezinski goes back to the future today, as he begins his new job as a partner responsible for information technology strategies at Coopers & Lybrand.

Brzezinski, 51, returns to his consultant roots after a high-profile 4½-year term as vice-president of information services at the Chicago-based food-processing firm. Before joining Quaker in 1985, he was manager of consulting services at Lexington, Mass.-based Nolan, Norton and Co. Brzezinski resigned from Quaker four months ago [CW, June 26].

Brzezinski said he interviewed for IS executive positions in his initial job search, but a return to consulting held more of an appeal. "Early in the game, I felt that I would reach a lot more of my personal goals in consulting," he said. "Coopers was the right match. They are very serious about expanding their technology consulting practice nationwide."

The size of Coopers & Lybrand's IS consulting practice ranks "somewhere in the middle" of the original Big Eight auditing firms, well behind runaway leader Andersen Consulting, said David Lord, managing editor of Fitzwilliam, N.H.-based newsletter "Consultants News." Coopers is the only Big Eight firm that has not sought a merger partner.

"I think they've played it pretty smart," Lord said. "They have probably made some inroads while these other firms are fooling around with each other."

At Coopers & Lybrand, Brzezinski said he hopes to help clients build the bridge between IS and senior management that was sometimes missing at Quaker as well as at many other companies.

"It's a personal goal of mine to help this [IS and business] process so it isn't so volatile," he said.

Brzezinski *relishes new role*

DEC floats MAP option

BY ELISABETH HORWITT
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. last week announced its first commercial product based on the Manufacturing Automation Protocol (MAP) Version 3.0.

DEC is offering manufacturing customers the option of basing their networks on either its Decnet protocols, which are based on the Ethernet 802.3 standard, or MAP, which is based on the 802.4 Token Bus standard. DEC's VAX DEC/MAP Version 3.0 products implement Layers 3 through 7 of the protocol on either local-area network topology, the vendor said.

The availability of DEC's 3.0 product, slated for December, plus IBM's expected shipment of MAP 3.0 on its Personal System/2, almost a year late, will spark some additional interest in MAP, according to Bruce Richardson, a vice-president at Cambridge, Mass., research firm Advanced Manufacturing Research, Inc.

DEC MAP 3.0 runs on VAX VMS systems. Migration from existing DEC MAP 2.1 products to the 3.0 version involves a software — but not a hardware — trade-in, DEC said. Pricing was not announced.

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Biin cuts activity, seeks buyer

BY J. A. SAVAGE
CW STAFF

HILLSBORO, Ore. — Fifteen months after Intel Corp. and Siemens AG formed Biin to market a proprietary fault-tolerant system with a Unix shell, the company is looking for a buyer.

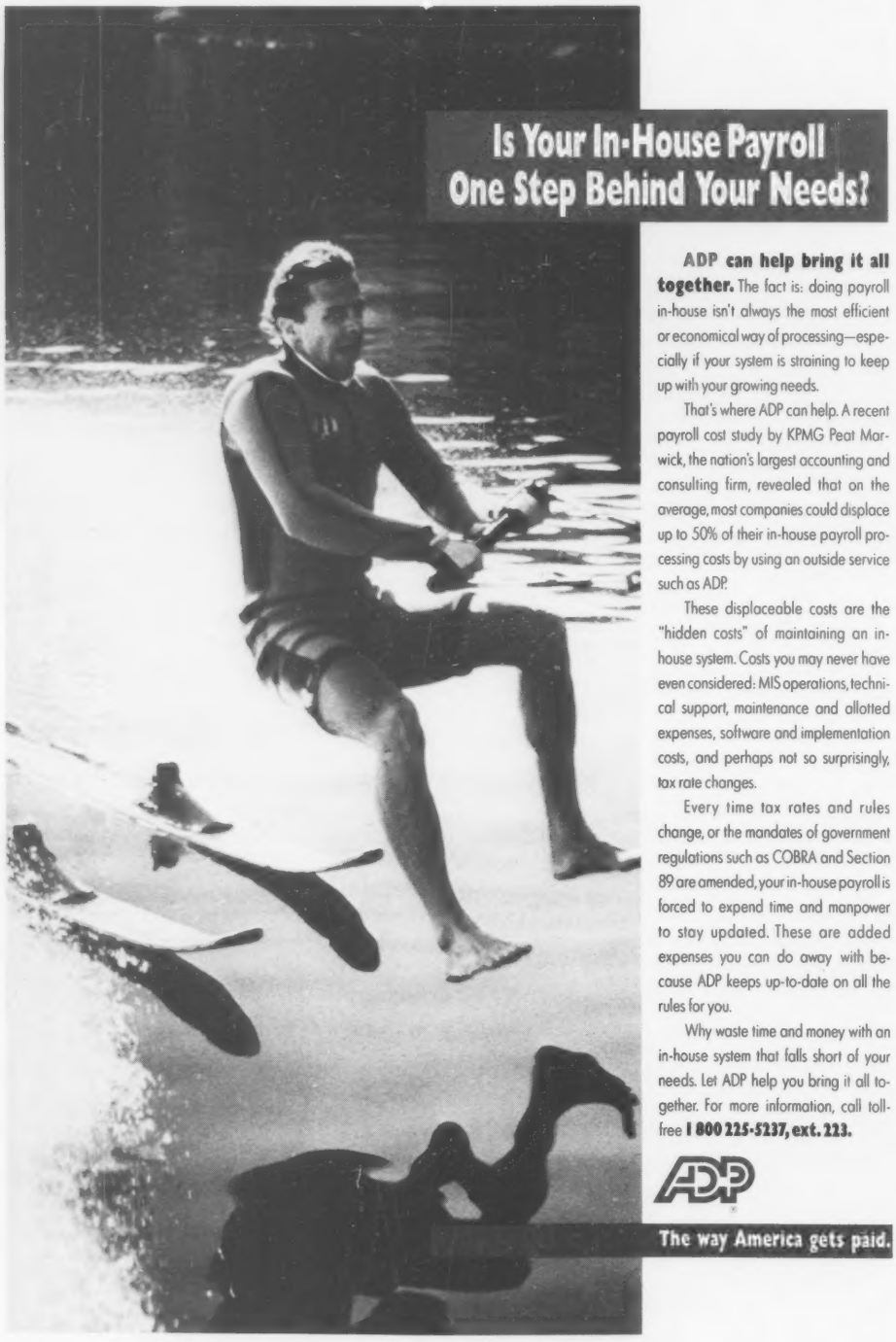
"In a matter of weeks, some decision will be made, whether to liquidate or to wait," said Jeff Houdret, director of marketing communications at the company. He said there were two interested parties but would not divulge their names. In the interim, Biin is "limiting its activities," according to a company statement, and will not pursue layoffs of the 450-person work force.

Originally aimed at competing with IBM, Digital Equipment Corp. and Tandem Computers, Inc. in fault-tolerant systems, Biin has approximately 75 systems out on evaluation, most of which are not paid for, according to Houdret. "Fault tolerancy is nice, but there is not a screaming need for it," said Sandra Gant, an analyst at Santa Clara, Calif.-based Infocorp. She said that companies that make fault-tolerant products often go "belly-up."

Another problem, Houdret admitted, was the proprietary operating system: "I suspect things might have been different if we hadn't been so different-sounding. Data processing people are not often risk takers. Not many of them are willing to put their jobs on the line for new technology."

Siemens is interested in the company's board technology, according to Biin. Intel will also continue to manufacture Biin's line of chips, a version of Intel's 960 XA, a spokeswoman for the processor maker said.

The partners in Biin claimed they found the company would take too long to make a return.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Benchmark group issues testing suite

BY J. A. SAVAGE
CW STAFF

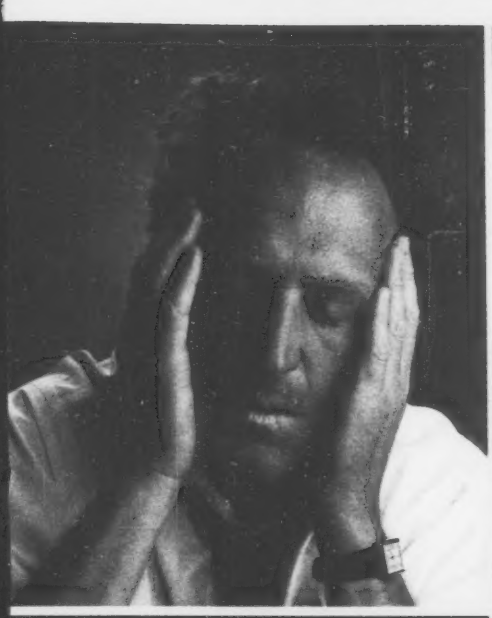
Alleviating the need for new technical and engineering performance measurements, the first benchmark suite from the Systems Performance Evaluations Cooperative (SPEC) is available for reduced instruction set computing (RISC)-based technical workstations and minicomputers, the organization announced last week.

The apparent necessity for that set of performance indicators grew as RISC machines became available, SPEC claimed. Other performance standards, such as Whetstones and Dhrystones, were unusable with RISC because they ran in microseconds — too fast to measure effectiveness, according to Nhan Chu, vice-chairman of the cooperative and manager of the BSD workstation division performance group at Sun Microsystems, Inc.

The cooperative was looking for a performance measure beyond Whetstones and Dhrystones, or what Chu identifies as "tiny" benchmarks.

One user said she would first dissect the benchmark for insight into how it worked before applying it to systems. "We're interested in learning more about benchmarking," said Kathryn Evans, a computer analyst at the Army Corps of Engineers in Vicksburg, Miss.

Claiming it is drawn from such real applications as C compilers, the group said the Release 1.0 tape is currently available for the cost of production — $450. The first version measures integer and floating-point performance, according to Chu. Down the line, the cooperative expects to have a benchmark that includes I/O and graphics performance.



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Object-oriented code touted as Cobol spaghetti untangler

BY ROBERT MORAN
CW STAFF

Object-oriented programming may soon take a bite out of Cobol "spaghetti code."

In November, the Codasyl Cobol Committee, an industry organization whose recommendations are often adopted into ANSI standards, will discuss three proposals to bring the software modeling techniques in object-oriented languages to bear on the life cycle of Cobol applications. Micro Focus Ltd., Realia, Inc. and Hewlett-Packard Co. have each submitted draft proposals aimed at tackling spaghetti code, the long and often convoluted strings of code produced by maintaining old Cobol programs.

Sources said that the three companies could have implementations within two or three years.

According to committee member Megan Adams, a software engineer at HP and author of a paper presented to the committee in August, "software companies will not wait for this to work through the standard process before offering implementations."

She said that Cobol programs with object-oriented features will conform to the language, but to get the benefits of the new feature sets, users may have to add something to their old programs.

Noncommital

Although she would not comment on whether HP will bring out an implementation, Adams said other companies will bring object-oriented technology to Cobol either through preprocessors or by adding features to compilers.

Ken Belcher, president of Chicago-based Realia, said that the company could have a micro-based implementation as early as late 1990 or early 1991, but would not discuss specifics.

Roger Knights, president of SPC Systems USA in Seattle, said that he hopes the "ANSI standards committee will use its processes to get this thing ahead of the next official standard."

According to Nathan Goodman, senior vice-president at Codd and Date Consulting Group in Boston, if the object-oriented additions are done well, Cobol will receive improved modularity but will also require considerable costs for retraining Cobol programming staffs.

"Even if they do work correctly, it may not be practical to combine old Cobol with new Cobol," he said. "The styles will be very different."

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IMSL

AT&T, Pyramid deal set to take high-end RISC

BY J. A. SAVAGE
CW STAFF

MOUNTAIN VIEW, Calif. — In an effort to develop the high end of the Unix-based reduced instruction set computing (RISC) business for itself, AT&T will pour about $400 million into a joint development project with Pyramid Technology Corp. during the next four years. In the meantime, AT&T will remarket Pyramid's current high-end product, the MIServer, and use it internally.

For Pyramid, one of the earliest RISC makers, this is a needed domestic boost. While it has remained profitable, it has made few gains in a market that has grown increasingly crowded in the last two years with players such as Hewlett-Packard Co. and Sequent Computer Systems, Inc.

Analysts agreed the deal was significant but disagreed on its degree of importance. "This is a salvation for Pyramid; it would not have survived," said Robert Kidd, an analyst at Dataquest, Inc. in San Jose, Calif. However, J. Neil Weintraut, an analyst at San Francisco-based Hambrecht & Quist, Inc., estimated that income from AT&T will amount to less than 10% of Pyramid's gross revenue next year, and he claimed the company would have survived without it.

While none of the $400 million is to be a stake in the firm, "if there are any problems with supply, a financial arrangement would be made quickly," Kidd said.

AT&T has its own Unix systems, including the 3B2 and the 3B4000. James Clark, vice-president of AT&T product management and development, said the company is not dropping the earlier models but adding instead at the top end. "In the future, we're working on above $100,000 to $1 million range," he said.

AT&T has in the past teamed up with Amdahl Corp. to market mainframes running Unix operating systems, but AT&T was not ready to make the leap to develop such an expensive technology, according to Clark. Neither firm would say what new product would be developed or when it might be available. In the interim, AT&T will offer Pyramid's MIServer with four models from 14 million to 140 million instructions per second.

Mainframe? No way.

"Fifteen minutes with Oracle Financials, and I knew I'd never be here justifying a mainframe to the board."

Len LeBlanc, *VP and CFO, Cadence*

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Bull buyout may be Zenith user boon

BY RICHARD PASTORE
CW STAFF

The proposed sale of Zenith Data Systems to Groupe Bull is likely to mean better service for Zenith users and a reversal of fortunes for parent Zenith Electronics Corp. At the same time, Bull's dream of being a full-line global computer giant is that much closer to reality.

The plan, announced last week, calls for Bull to pay an estimated $600 million to $635 million for Zenith Electronics' $1.4 billion computer operations, including Zenith Data Systems (ZDS) and the Heath electronics kit operation. The proposal, subject to stockholder and regulatory approval, is expected to be finalized by year's end.

Zenith's Pearlman

For several years, Zenith Electronics has been juggling two businesses — computers and consumer electronics — and computer customers have gotten lost in the shuffle, said users and observers.

"At Zenith, the computer business was the odd man out," said ZDS customer Barry Harmer, vice-president of information services at Old Stone Credit Corp. in Jacksonville, Fla.

"Zenith was somewhat stressed [by] being split into the consumer/TV side and the data systems side," agreed Mark Eppley, president of Traveling Software, Inc., a Bothell, Wash.-based company that manufactures products for use with Zenith and other portable machines. "You need a clear focus and direction to be competitive."

Bull's Mackenzie

Bull will provide ZDS with that focus, which could pay off in improved service for users, according toZDS customers. "I don't think Zenith did a good job marketing their overall product line," said George Tabback, director of corporate information systems at Ingersoll-Rand Co. in Woodcliff Lake, N.J. "Bull has a stronger distribution network already in place and perhaps a better maintenance organization as well."

Though he said it was premature to discuss strategy, Ward Mackenzie, executive vice-president of business planning at Bull's U.S. subsidiary, Bull H. N. Information Systems, Inc., said ZDS customers will not see significant changes. "Its channels of distribution, marketing organization, engineering and manufacturing will be unchanged," Mackenzie said.

Conversely, parent Zenith Electronics, burdened with a $416 million debt and a $25 million net loss since 1985, hopes to realize substantial financial changes from the sale.

The money from the sale will let the parent firm pay its debt, increase investment in its high-definition television research and pocket $22 million for the year, said Zenith Electronics Chief Executive Officer Jerry Pearlman: "The transaction will mean that our balance sheet will be strengthened significantly."

IBM eyes service bounty with new AS/400 support options

BY ROSEMARY HAMILTON
CW STAFF

IBM made its latest push for service dollars last week by introducing more support options and improving existing ones.

Application System/400 services, Help desk support, expanded disaster recovery services and additional networking support were included in the announcement, which also reflected IBM's increasing use of expert systems to help automate clients' support function. "The bigger context is that the things you used to get for free when you bought a mainframe 20 years ago you are now paying for," said Peter Kastner, a vice-president at the Aberdeen Group in Boston.

The AS/400 options present an interesting twist, because IBM has positioned the system as easy to use.. The service offerings do not mean that the system is harder to maintain than IBM has indicated, said John Reuter, director of service delivery, applications business systems for IBM's National Service Division (NSD).

Instead, Reuter said, the services are aimed at very small user sites that do not want to keep system expertise in-house. A second target is the very large AS/400 customer who would find it more economical to have IBM support its remote AS/400, he said.

The AS/400 package consists of three offerings: Customized Operations Services Express, which covers the preparation of an AS/400 installation; Installation Quickstart, which is the actual installation; and Systemxtra, which is the ongoing hardware and software support. Pricing on the three varies depending on the customer site. As an example, Installation Quickstart for a typical AS/400 B10 would cost about $3,500; on larger models, it would cost $2,065.

The Customized Operations Services Express option will be available in January 1990; the other two are available now.

The Help desk and networking services are intended to automate portions of these operations. Problem Management Productivity Services for Help desks is designed to replace what is typically a manual system of logging in user complaints and finding a solution in system documentation.

According to Pat Kearney, IBM's vice-president of software services at NSD, the system will prioritize problems and has also been programmed to alert IBM support personnel automatically if a reported problem is hardware-related and requires maintenance service from IBM.

Kearney said a typical package for a Help desk of six people would cost about $36,000 up front, with monthly license payments of about $4,000.

The Network Traffic Analysis offering links a customer to an IBM support facility in Gaithersburg, Md., for System Network Architecture network problem solving. In this case, the expert system will run at the IBM facility and suggest solutions for such problems as network bottlenecks and configuration planning.

The networking service costs $500 per hour, and customers are required to sign up for a minimum of three hours per month, explained Rick Perkins, vice-president of operations services at NSD.

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IBM sets date for delivery of SMS to VM users

BY ROSEMARY HAMILTON
CW STAFF

IBM said last week it will begin delivering its System Managed Storage (SMS) software to the VM operating environment in December.

At the same time, it rolled out several enhancements to its SMS package for MVS/ESA, which its customers have had the option of moving to since earlier this year.

The organization plans to initially provide two basic SMS facilities for VM users to help them get the ball rolling, said Bill Reedy, director of storage systems, U.S. marketing and service. The other major components of SMS, which are collectively known as Data Facility Storage Management Subsystem (DFSMS), are slated to be released at an unspecified future date.

SMS is IBM's storage concept that includes software, hardware and procedures that together are intended to more logically manage data and storage devices.

The new features for DFSMS under MVS/ESA include the following: a dynamic cache management function; a built-in disaster recovery feature; a data collection utility; automatic reuse of disk space when data is deleted; and support of Object Access Method, a key piece of IBM's Imageplus products that sets guidelines for access in image and graphics applications.

September 19, 1989
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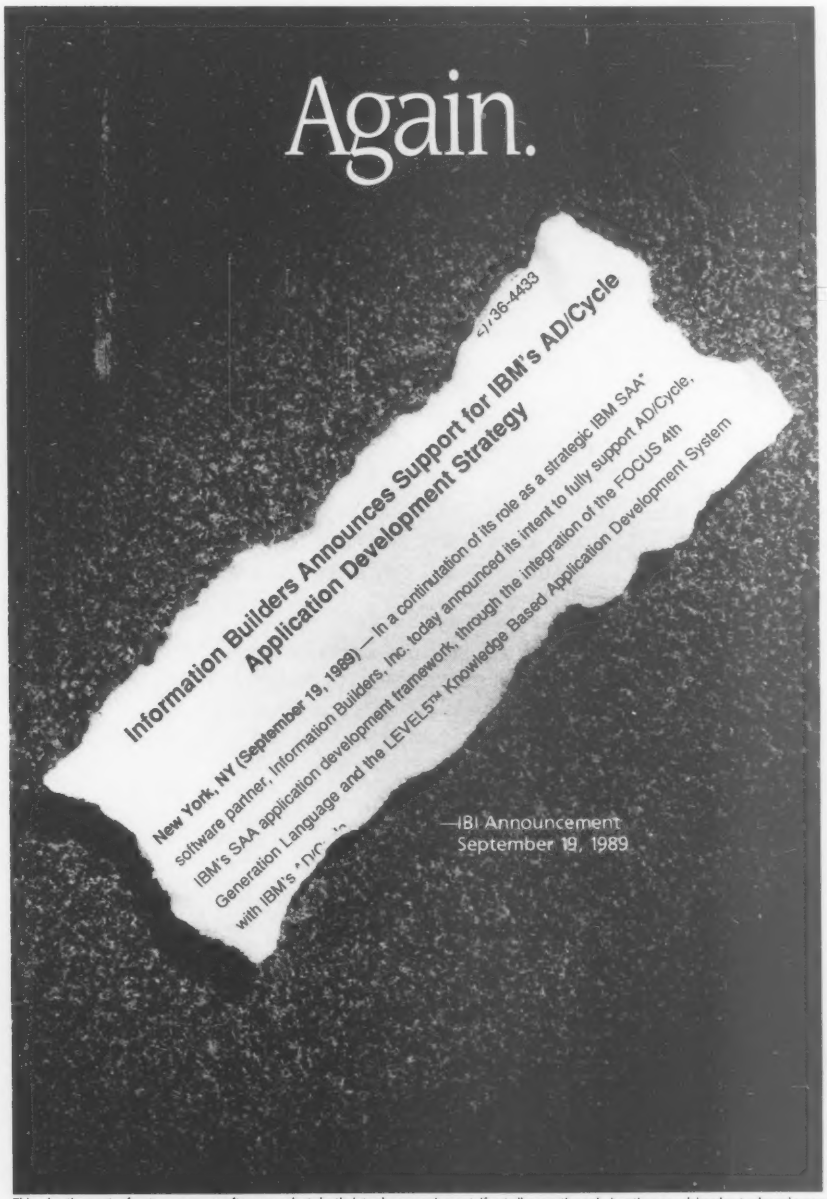
Again.
Information Builders Announces Support for IBM's AD/Cycle Application Development Strategy
New York, NY (September 19, 1989)—In a continuation of its role as a strategic IBM SAA* software partner, Information Builders, Inc. today announced its intent to fully support AD/Cycle, IBM's SAA application development framework, through the integration of the FOCUS 4th Generation Language and the LEVEL5™ Knowledge Based Application Development System with IBM's
—IBI Announcement
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Again, Information Builders has commited to fully supporting IBM's SAA initiative. As a strategic IBM SAA software development partner, IBI will support the AD/Cycle application development framework with the FOCUS 4GL and LEVEL5 knowledge base application development system.

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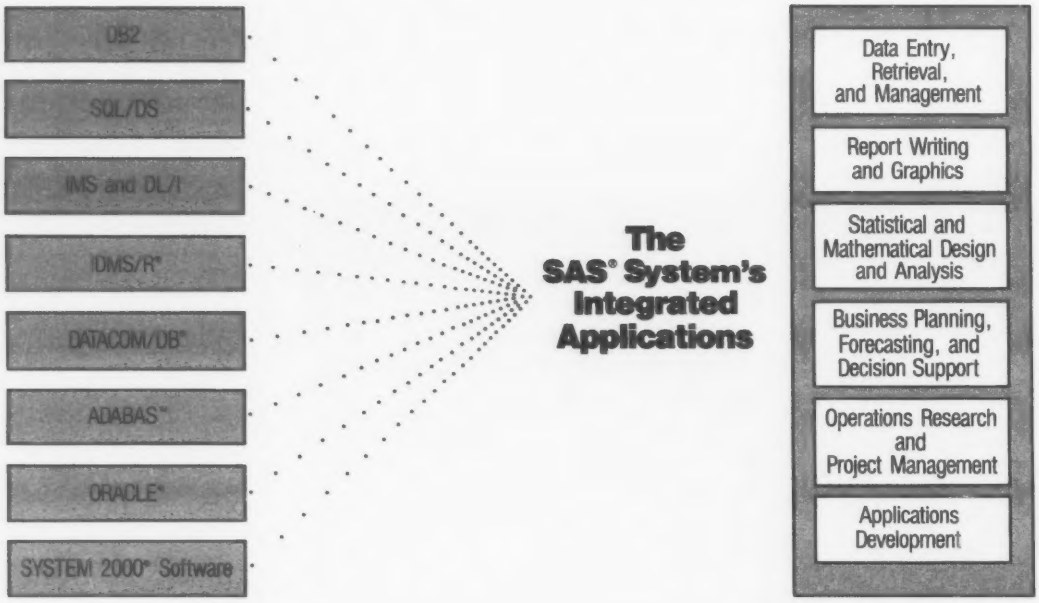

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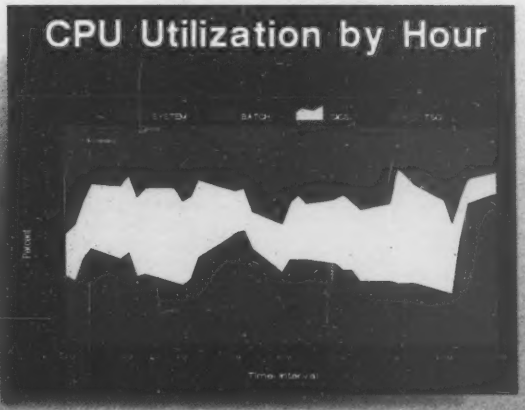

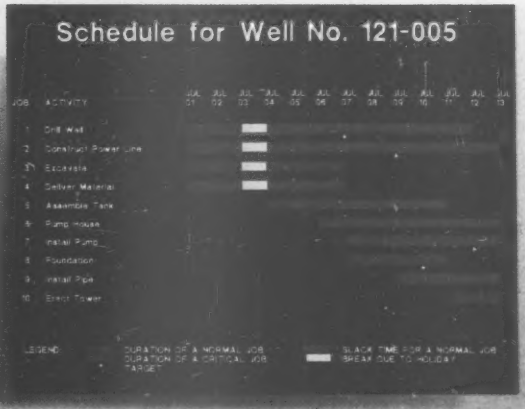

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Clouds hover over TOPS unit

BY JAMES DALY
CW STAFF

Speculation that a cash-hungry Sun Microsystems, Inc. is shopping for buyers of its TOPS networking division gained momentum last week as officials from both Sun and TOPS suddenly replaced a string of trenchant denials with ambivalent shrugs.

Once the golden boy of the Sun stable, TOPS has lately been dogged by reports of slowing sales, compatibility problems, the delayed and since-abandoned Version 2.2 and departures of several executives.

Additionally, Sun has been forced to keep a sharp eye on its piggy bank. Sun's $20.3 million net loss for the quarter ended June 30 was followed last week by news that at best it will only break even for the quarter ended Sept. 30. Although a hiring freeze went into effect in July, cash remains tight; in the past two weeks, Sun has revealed a pair of financing plans intended to bring $251 million into the company coffers.

A Sun spokesperson confirmed that the company is "aggressively going through cash" because of an ambitious growth schedule and a broad product line that necessitates the need for a large product inventory. Sun maintains three separate hardware platforms, drastically increasing its financial drag.

"Sun is interested in selling anything that they don't see as central to their long-term strategy because they've had a tremendous increase in inventories, and they need working capital," said Bob Herwick, an analyst at San Francisco-based research firm Hambrecht & Quist, Inc.

Observers said a sale could be very lucrative for Sun. TOPS was purchased for only $20 million in April 1987 by Sun, which scooped the company away from 3Com Corp. Sun saw TOPS — then known as Centram Systems West — as a means to extend its Unix connectivity down into the personal computer and Apple Computer, Inc. Macintosh world and as a natural complement to its Network File System. Today, TOPS officials say its number of installed nodes is surpassed by only Novell, Inc. and IBM.

To the highest bidder

Observers debated over who would be interested if the division is for sale.

Original suitor 3Com? "I don't think so," said Bob Metcalfe, founder and vice-president of marketing at 3Com. "The product synergies that were attractive then are not so attractive now. We've made alternate plans since then."

Novell? "Possibly," said Craig Cline, associate editor for the "Seybold Report on Publishing Systems" newsletter. "Novell has been forced to reinvent so much themselves because of the way they developed their software, so they may be inclined buy some Mac expertise."

How about Apple? "Since a lot of their installed base uses [TOPS], they might want to make sure it had a happy home," Herwick said. "The only rub there is that it would be emotionally difficult for Apple to help Sun out financially."

Analysts added that a buyout by the division's management group is also a possibility.

Only weeks ago, Sun President Scott McNealy and TOPS Vice-President and General Manager Richard Shapero vehemently denied that the unit was for sale. Since then, the rebuttals have been markedly watered down. "We can't confirm or deny the reports," spokesperson Kim Tarter said.

In addition, there have been reports that Sun was considering selling the Billerica, Mass.-based group in charge of computers based on Intel Corp. microprocessors. Those rumors have been hotly denied by McNealy, who even went so far as to take out terse ads in major trade publications that called the reports "unfounded" and "not true."

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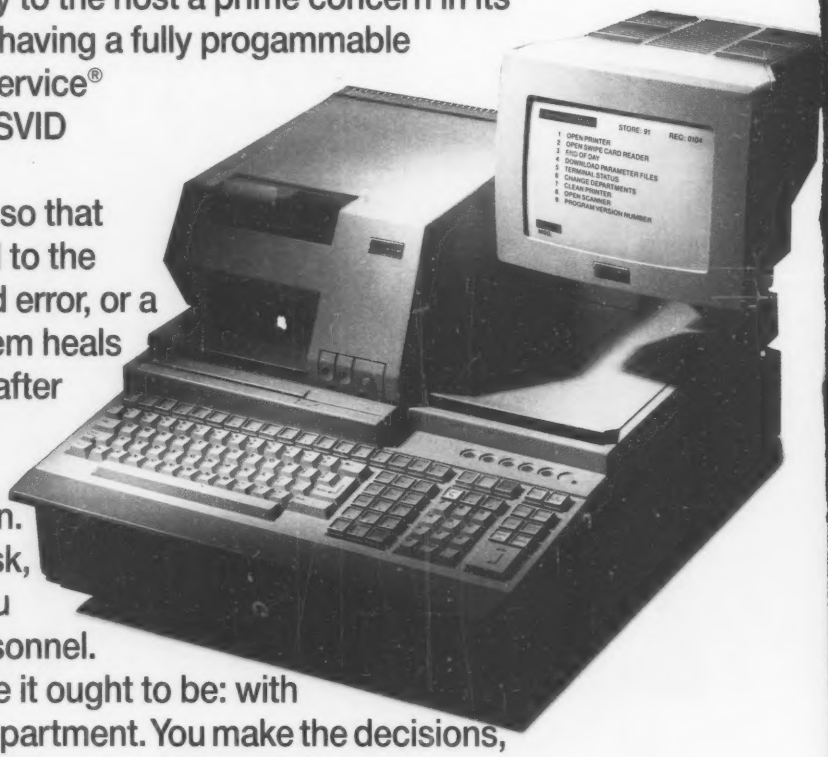

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Bank South agrees to cede control of data center to IBM

BY ALAN J. RYAN
CW STAFF

ATLANTA — Bank South Corp. has joined the growing list of companies on the leading edge of a new trend toward outsourcing data center operations.

The $5 billion multibank holding company announced that it has signed a 10-year agreement under which IBM will design, build and operate a new data center for Bank South. The data center will be located at Bank South's Operations Center at Atlanta Hartsfield International Airport and will consolidate data processing operations currently located there and at Bank South's Atlanta headquarters.

For its part, IBM will supply the computer hardware and systems software to run the data center but will subcontract the running of the computer room to Computer Task Group, Inc. in Buffalo, N.Y., according to Fred Cisewski, a senior vice-president and director of MIS for the bank. "The people-related work will be [CTG's] responsibility," he said, and Computer Task Group will also provide the systems programming services. IBM announced in May that it plans to acquire 15.3% of CTG.

The 75 Bank South data center employees affected by the consolidation will be transferred out of the firm's system. "Almost all of those employees will have opportunities to be employed by CTG," said bank spokesman Bo Spalding. Cisewski said there might also be employment opportunities within IBM as well.

For the bank, the benefits are many, Spalding said: "The equipment will no longer be Bank South's property; it will be IBM's property, and they will supply us with computer services in the same manner that the telephone company provides us with telephone services." That means a substantial cost savings, especially if broken down in comparison with projected expenses over the 10-year period if the bank were to continue operating as it had been, Cisewski said.

"The computer equipment that we acquire is very expensive, and it becomes outdated a year or two years after we buy it," Spalding said. "Having IBM run that data center is more practical and more cost-effective for us as well," since the company is on the cutting edge of hardware and software evolution.

For end users within the bank, the move to the IBM management will be transparent. "If any of our end users have a problem, they will just call the Help desk at the data center," Cisewski said.

Bank South will pay IBM an annual fee, broken down into monthly payments, Cisewski said. The bank has more than 3,000 employees in 139 locations.

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SIZE OF APPLICATION	FIRST
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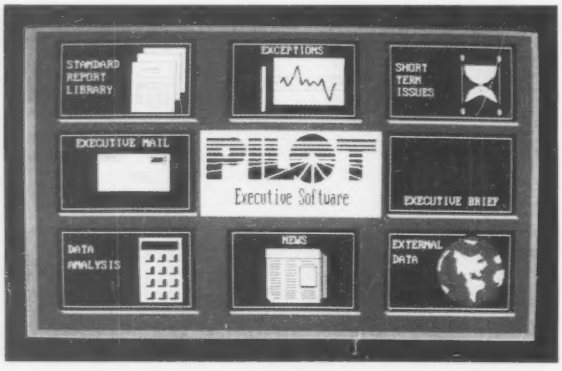

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IBM promises more support at Guide forum

BY CHARLES VON SIMSON
CW STAFF

SAN FRANCISCO — The IBM mainframe faithful heard a spruced-up version of a familiar Big Blue pledge to be more responsive to the customer at a symposium sponsored by Guide, Inc. last week.

The closest thing to specifics came from Terry Lautenbach, IBM senior vice-president and general manager of IBM United States. Lautenbach told Guide members that the company will offer information to large customers on its own internal implementations of Officevision and computer-integrated manufacturing (CIM) technology and methodology.

Companies that have already taken IBM up on the offer for Officevision information include Chase Manhattan Bank, 3M Corp. and Southern California Edison Co.

Assiduous help

"A project manager from IBM's internal IS division who is responsible for implementing Officevision has been out to see our people two or three times," said John Fielder, vice-president of information systems at Southern California Edison. "She is sharing her thoughts with our staff on a number of projects. After all, we are supposed to be in the same boat."

Ford Motor Co. is using an IBM internal CIM system for personal computer manufacturing in instrument panel manufacturing and has reduced costs by 25%, according to Lautenbach. "You will be able to talk to the IBM executives making CIM happen," Lautenbach told Guide members.

If the big picture views of such speakers as MIT's Lester Thurow, futurist and author John Naisbitt and Deere & Co. President and Chief Executive Officer Hans Becherer were short on specifics, they got no complaints from the gathered members of Guide, who had nothing but praise for the program's concentration on the role of technology in global competition.

A Comparison Chart of the Major Cooperative Processing Software Products:

Functions:	SUPER-LINK® Family	Easel™	Mozart™	Arbiter®	IBM's HLLAPI	IBM's APPC™ or CPI-C™
Processing Topologies Supported						
SAA CUA Interface for existing 3270 applications:						
Under PC/DOS	Yes	No	No	No	No	No
Under OS/2	Yes	Yes	Yes	No	No	No
Transition from PC/DOS to OS/2	Yes	No	?	No	No	No
3270 Communications	Yes	Yes	Yes	No	Yes	No
Peer-to-Peer Communications:						
for extending existing 3270 applications	Yes	No	No	No	No	No
for new applications	Yes	No	No	Yes	No	Yes
Maintenance of PC applications & data from a central library	Yes	No	No	No	No	No
Background file transfer in PC/DOS	Yes	No	No	No	No	No
Background peer-to-peer processing in PC/DOS	Yes	No	No	No	No	No
Object Orientation	Yes	Yes	No	No	No	No
CASE/Application Generation	Yes	No	No	No	No	No
SAA CUA Support						
All functions supported on PC/DOS:	Yes	No	No	No	No	No
Action Bar	Yes	*	Yes	No	No	No
Pull-down menus	Yes	*	Yes	No	No	No
Pop-up menus	Yes	*	Yes	No	No	No
Messages and Prompts	Yes	*	Yes	No	No	No
Dialog Boxes	Yes	*	Yes	No	No	No
Forms	Yes	*	Yes	No	No	No
Direct support for multiple levels of action bars and pull-downs	Yes	*	No	No	No	No
Action bars and Pull-downs in a form	Yes	*	No	No	No	No
Single and multiple selection menus	Yes	*	No	No	No	No
Menus and Lists within a form	Yes	*	No	No	No	No
CUA defined help	Yes	*	No	No	No	No
Development System Features: available without programming						
Field-level context-sensitive help	Yes	No	Yes	No	No	No
Optional learning mode (help always displayed)	Yes	No	No	No	No	No
Embedded User Assistance (pop-up selection lists)	Yes	No	No	No	No	No
Dictionary for storage and re-use of definitions & documentation	Yes	No	No	No	No	No
Data Editing/Validation:						
Data type/mask checking	Yes	No	Yes	No	No	No
Range/limit checking	Yes	No	No	No	No	No
Date formatting/checking	Yes	No	No	No	No	No
Validation against database files	Yes	No	No	No	No	No
Required fields	Yes	No	No	No	No	No
"Must Fill" fields	Yes	No	No	No	No	No
Zero not valid fields	Yes	No	No	No	No	No
Multiple validation points during PC processing of transaction form	Yes	No	No	No	No	No
Complete local application testing, database maintenance, interface testing, and mainframe communications simulation	Yes	No	No	No	No	No
Language Objects Available Without Low Level Programming						
Display and selection from:						
In-memory lists	Yes	Yes	Yes	No	No	No
File lists	Yes	No	Yes	No	No	No
Database lists	Yes	No	Yes	No	No	No
Menu display and selection	Yes	No	Yes	No	No	No
Help at all levels: (Panel, Action bar, Menu, Form, & Field)	Yes	No	Yes	No	No	No
Error Processing	Yes	No	Yes	No	No	No
Add/update/delete/locate on:						
Sequential files	Yes	Yes	Yes	No	No	No
Database files	Yes	No	Yes	No	No	No
Host logon sequence	Yes	No	No	No	No	No
Determining 3270 screen identification	Yes	No	Yes	No	No	No
Read/Write all fields on 3270 screen with a single command	Yes	No	No	No	No	No
Determine dynamic 3270 field attribute changes	Yes	No	No	No	No	No
Dynamic modification of field attributes based on form entries						
Initial values displayed	Yes	No	No	No	No	No
Protected/unprotected fields	Yes	No	No	No	No	No
Development Environment Comparison						
Object Orientation	Yes	Yes	No	No	No	No
Dictionary and documentation	Yes	No	No	No	No	No
Panel/Form painter for Creation/Maintenance	Yes	Yes	Yes	No	No	No
3270 screen capture: Picture and attributes	Yes	No	No	No	No	No
Application Generation (CASE)	Yes	No	No	No	No	No
Intelligent editor (language sensitive)	Yes	No	No	No	No	No
System/user defined templates	Yes	No	No	No	No	No
Integrated compile/test/debug	Yes	No	No	No	No	No
Keyboard re-mapping	Yes	Yes	Yes	No	No	No
Compiled environment	Yes	Yes	Yes	No	No	No
Execution-time source debugging	Yes	Some	No	No	No	No
Host Environments Supported for Peer to Peer						
MVS - CICS	Yes	No	No	Yes	No	No
MVS - IDMS/DC	Yes	No	No	No	No	No
MVS / TSO	Yes	No	No	No	No	No
DOS / VSE-CICS	Yes	No	No	Yes	No	No
VM / CMS	Yes	No	No	Yes	No	No
DEC VAX / VMS	Yes	No	No	No	No	No
Minimum PC Hardware Requirements: IBM XT / Clone, 640k	Yes	Yes	Yes	Yes	Yes	Yes

*Easel does not support the SAA CUA style interface under PC/DOS only under OS/2.

Every effort to present an accurate chart has been made, however no guarantee can be made (8/7/89). Super-Link® is a registered trademark of Multi Soft, Inc. , Lawrenceville, NJ. , Mozart™ is a trademark of Aspen Research. Easel™ is a trademark of Interactive Images, Inc. Arbiter® is a registered trademark of Tangram Systems.

Multi Soft's SUPER-LINK® Family delivers SAA/CUA on DOS platforms Now!

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- **And much much more!**

Now you can create SAA/CUA-compatible interfaces in minutes and integrate them into existing mainframe applications.

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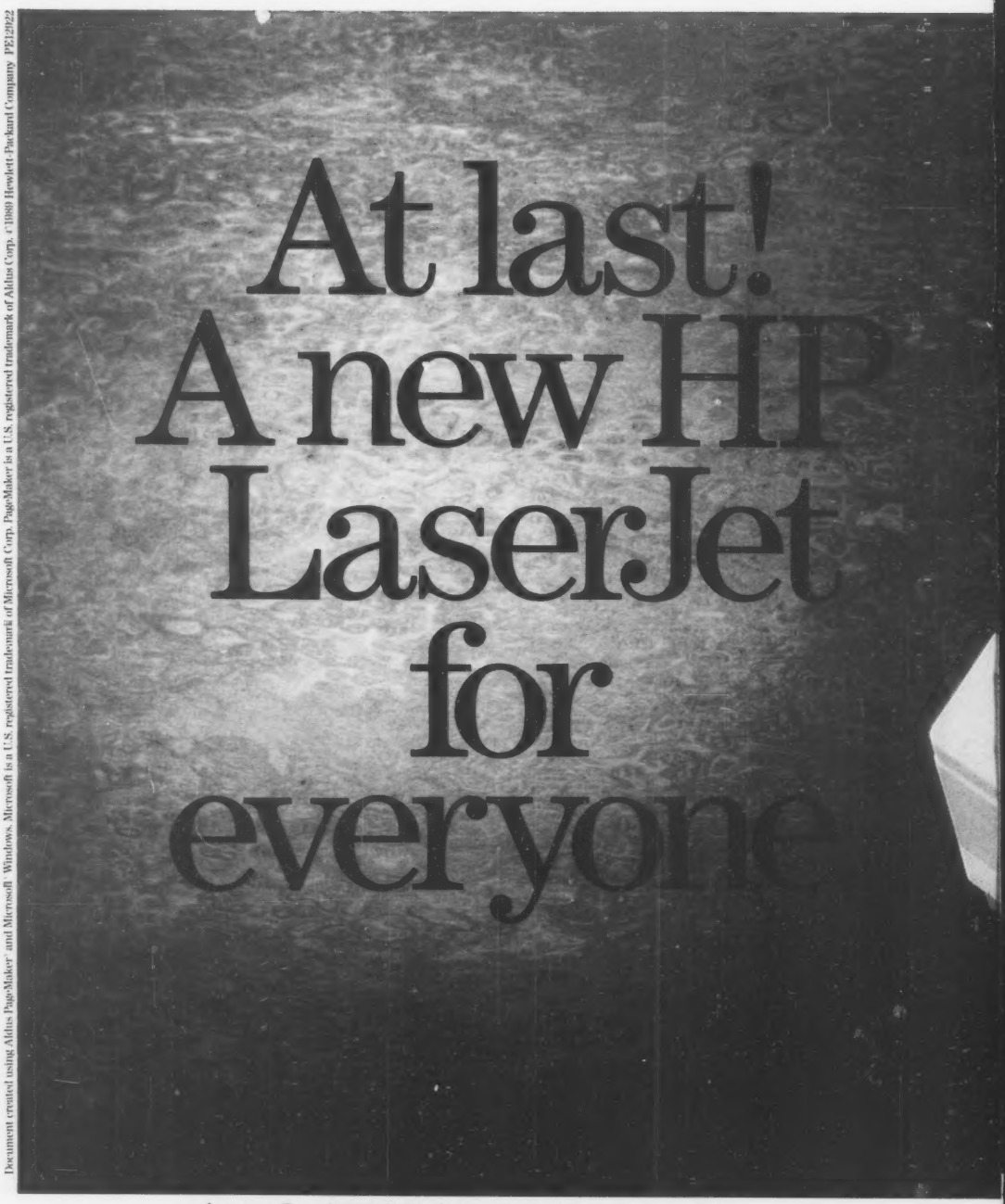

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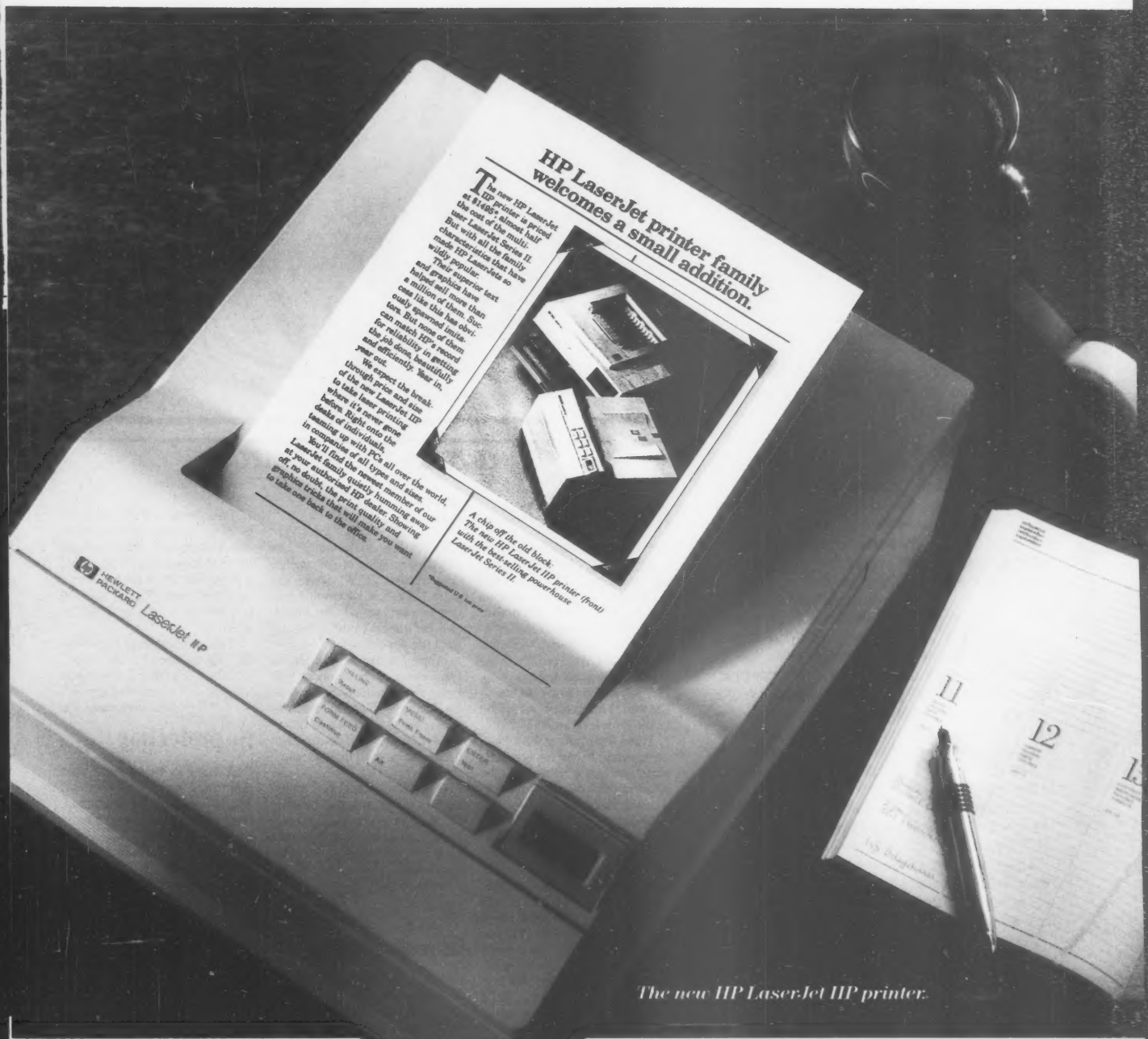
At only $1495*, it's got "personal" written all over it.

The HP LaserJet printer family has expanded—in a small way.

The new HP LaserJet IIP (as in Personal) fits on a desk. And, with a price almost half of the multi-user LaserJet Series II*, into most budgets.

Yet it's fully compatible with virtually all popular PC software and the LaserJet Series II. It has the same 300 dpi resolution. And carries on the family's reputation as the most reliable laser printers on the market.

*Suggested U.S. list prices: LaserJet IIP $1495; LaserJet Series II $2695. Dealer prices vary.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The new HP LaserJet IIP printer is priced at $1495* almost half the cost of the multi-user LaserJet Series II. But with all the family characteristics that have made HP LaserJets so widely popular.
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HEWLETT PACKARD LaserJet IIP
11
12

The new HP LaserJet IIP printer.

The LaserJet IIP was designed to be easy for any PC user. The simple front panel provides push-button control over the menu, the 14 internal fonts, form feed and other functions. It handles four different paper sizes: letter, legal, executive and A4, as well as envelopes. In portrait or landscape configurations. At four pages a minute. From one or two paper bins (the second is optional).

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HEWLETT PACKARD

EDITORIAL

Painful transition

THROUGHOUT NEARLY ALL of this decade, the ebb and flow of fortunes among the computer product vendors could be reasonably well-pinned to specific internal or external dynamics.

The primary determinant of a vendor's balance sheet has been internal product cycles. Consider the steep and sudden skid experienced by DEC in 1983, sparked by a year-long delay in rolling out a new generation of VAXs. Or consider the roller coaster ride of the semiconductor companies, which twice ramped up production in the 1980s just as demand for their products started to slacken.

And predictably, these dynamics would foster the gyrations of mass layoffs, management shake-ups, mass rehirings and wildly fluctuating stock prices.

That was the case for most of this decade.

But today, with the industry on the threshhold of the 1990s, there is a new set of dynamics in operation. Unlike the more blatant forces of change that have come before, this set of forces is lurking beneath the surface, just like those insidious, omnipresent "things" that are the dark heart of Rod Serling's *Twilight Zone*.

Consider the breadth of the upheaval in some of the most venerable companies in this business. Last week, the heir apparent to the throne at DEC, the second largest computer company, abruptly resigned after 28 years with the firm. This summer, $3 billion Wang Labs underwent a dynastic change of leadership as it sought to rescue itself from oblivion. The third largest U.S. computer company, Unisys, initiated a series of layoffs that touched off rumors of major changes at the top.

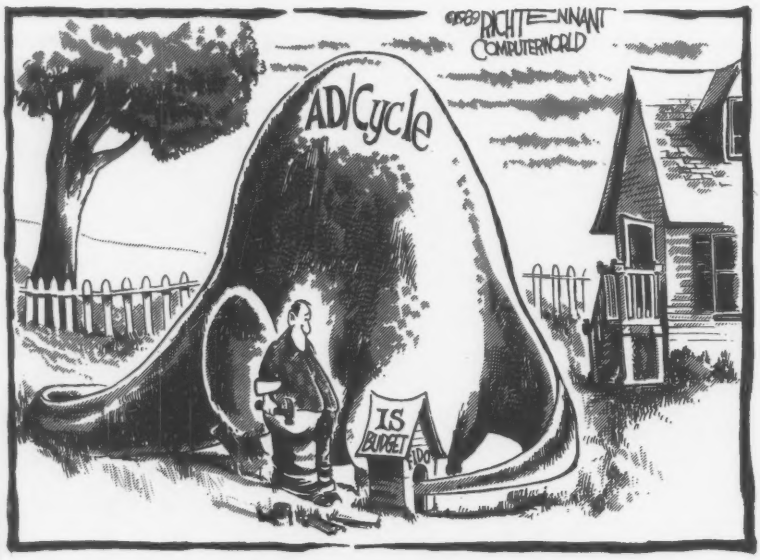
And how about the No. 1 computer firm? With the stock market hitting record highs last week, IBM's share price dropped by almost 10%.

These woes and the problems of other computer vendors caught the industry by surprise, which suggests that a new set of change dynamics is at work. What's going on?

Perhaps the key is in the words of Sony Chairman Akio Morita, who wrote in *The New York Times* this month: "American companies should shift their time horizons . . . The short-term orientation of corporate management in the U.S. encourages neglect of long-term investment vital to industry . . . The financial community [in the U.S.] seems to concentrate on 10-minute time frames."

How much of the turmoil in which so many companies find themselves embroiled results from having taken the short-term and not the long-term view in investing and planning? Our guess is probably a lot.

In sizing up the road ahead for his company, IBM Chairman John Akers last week said IBM's short-term challenges are a transition to long-term growth, and that the company will stay the present course rather than restructure to achieve short-term profits. The industry needs more of that kind of thinking.



LETTERS TO THE EDITOR

A pip of a vendor

Did you attend the same convention that I did? "HP image yet to play in Peoria" [CW, Sept. 18] is a generally negative article on the Interex 1989 conference that indicates users are dissatisfied with day-to-day contacts with Hewlett-Packard Co. Robert Meissner is quoted as saying, "I can't find a single person at HP who is interested [in] selling on the same level as IBM."

When Pip Printing went looking for new hardware and software vendors a year ago, the sales staff that excelled in understanding both our business and technical needs came from Hewlett-Packard. IBM's Application System/400 presentation appeared to be tossed together at the last minute and their inability to fully grasp our business needs cost them our sale. IBM focused only on IBM solutions; the HP sales team put together a more appropiate configuration utilizing solutions from both HP and third-party vendors.

HP's broad understanding of our business environment and business systems in general succeeded in convincing Pip's MIS management to switch to HP.

Your story also says, "Users, while curious about the latest technology, appeared more interested in HP's older machines." Where were you at the rollout announcements for the HP 3000 Model 60, a new HP Lan Manager and demonstrations of New Wave? Attendees were far more excited and interested in HP's new product directions than you indicated.

Barry N. Zarakov
Manager
Corporate Computing
Pip Printing
Agoura Hills, Calif.

Slicing Apple

Amy Wohl's Viewpoint, "Can Apple get a slice of the service support pie?" [CW, Sept. 25], says: "There is no trouble getting excellent support for Macintosh computers from the regular Apple dealer channel."

Apple's dealer support, in my experience, is notoriously bad. Here, in the heart of Silicon Valley, I have yet to get satisfactory *repair* service from five different Apple dealers. I do not even bother them with difficult questions.

Apple's accounts are clamoring for direct support because the dealers are not delivering. Apple's response is to enhance customer self-support — a point completely missed in Wohl's column.

Rex Sanders
Palo Alto, Calif.

Objects to trend

I appreciate most of the articles in *Computerworld* and find the information useful. However, I object to the increasing trend of describing business deals using words generally applied to living people. I am referring to words such as "marriage," "divorce" and "euthanasia."

Although the authors usually use these words correctly in a technical sense, I feel CW would be wise to consider the effects of these words on the individual reader. Some of them can bring difficult emotions to the surface.

I also believe your use of these words will have a numbing effect as to the true nature of what these words really mean to real live people. I ask you to consider the effects of these terms on your readers and put a stop to this practice.

I also hope you will avoid the practice of using Biblical references incorrectly with a sarcastic or mocking tone. When using a reference from such a highly regarded work, I hope you will see that it is treated with respect.

Your publication is one of the best. Please keep it professional.

Derrick S. Birkhimer
Systems Engineer
Chambersburg, Pa.

No protection

Paul Gillin's Viewpoint, "And then there was IS" [CW, Sept. 18], states, "In the beginning, there was DP . . . and plastic pocket protectors . . ."

Perhaps Gillin could devote a future column to answering these questions: How many programmers or systems analysts do you know, or have you seen, who use plastic pocket protectors? In any case, what is it about plastic pocket protectors that sends you into orbit? Don't you wear boots when it snows? When it rains, do you wear a raincoat to keep your jacket from getting wet?

The stereotype of programmers wearing plastic pocket protectors is silly and erroneous and is not complimentary to a first-rate journal like CW.

Owen K. Darrath
Brockton, Mass.

P.S. I do not use a pocket protector of any sort, and I don't know anyone who does.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Night of the Papereater, Part I

CHARLES P. LECHT

These days, the volume of paper being pumped out of computer systems seems just plain endless. Something weird may be happening in and about computer systems that could be the subject of, say, a Stephen King novel.

Computerization was supposed to eliminate paper, not make more of it. As I see it, the more we use computers, the more paper we are using, and the relationship between the two is exponential.

As our systems — from micro to supercomputer — become ever more powerful, the things they can do become ever more encompassing. With each incremental increase in capability, volumes of documentation are generated to describe it. The new, more powerful computers are even more capable of processing paper, too. One small step in computer capability seems to mean one giant leap in the amount of paper it eats.

Offices throughout the world are being engulfed in documentation about the systems they possess, so much so that at the small systems level, manuals far exceed computer systems in the space they now occupy. If current trends continue, as computer systems become smaller and smaller, the mounds of paper required to describe them will get bigger and bigger. We may have reason to suspect that if computers vanished altogether, they would leave us a superdense documentation paper blitz.

Talk about yesterday's promise of today's paperless office. The offices I visit in Tokyo, center of the world's personal computer manufacturing community, are more laden with paper than ever before. This is despite the fact that they are more automated than ever before. What irony. Computer systems were supposed to eliminate the office paper mess, weren't they? Forget it. Computer printers are spewing out paper faster than it could ever be hand-carried into our offices before computers appeared on the scene. It almost seems like computers "originate" paper.

Each computer system appears a conduit through which flows tributaries to the massive river of paper that we generate each day. Forests are torn down to feed this massive propensity for sucking in pulp and converting it to — forgive me for being too cynical — mostly garbage.

And each system's birth appears to stimulate announcements printed by dozens of other systems to inform us of its arrival and what it can do. After this deluge has abated, the new system seems to obtain a life of its own and a soul dedicated to ingesting and spewing out paper. It's as though it were sent by a mysterious outer-space force whose goal it is to wrap the world in paper and smother its inhabitants. Take note, Stephen King, and credit me for the idea.

NICULAE ASCIU

The question is whether there really is a need for all the paper we use. I say no. Sure, it's still the handiest way to carry information around, read it on the subway or in the tub, so I am not about to suggest we abandon paper altogether. But it's about time we abandoned the stuff for such purposes as computer manuals. Other technologies are around that have made our need for so much paper obsolete. For example, is there any reason why today's computer systems cannot contain their own documentation? The quality of text and graphics possible in most modern systems is as good as any printer can offer.

Then there is videotape. One short tape explaining a technical subject or showing a business situation is worth volumes of writing about it. And it occupies far less space.

I know we need good actors for videotape, but if push comes to shove, I'd rather have a lousy actor in a slim videocassette than a poor writer in a fat manual.

But the bottom line is that we've got to lessen the amount of documentation by ridding our need for it. We can do this through implementation of more artificial intelligence in our systems. We need this artificial stuff because the real stuff (or lack thereof) is what's producing all the wasted paper that surrounds us.

Enter the scene, Papereater, like a real-life Pac-Man — chomp, chomp, chomp — heroic adversary of wasted resources and AI advocate. Take it from here, Stephen King, but please credit me.

Lecht is an IDG News Service correspondent based in Tokyo.

Eliminating the surprise factor in software contracts

LEE GRUENFELD

As businesses demand progressively more compatibility between their operations and their software, one of the more common system acquisitions is the purchase of a package with custom modifications.

Typically, the customer follows a fairly standard procurement procedure consisting of a detailed request for proposals (RFP), a careful evaluation process and the selection of a vendor. Usually, the vendor agrees either to perform the customization itself or to subcontract with a third party for these changes. There is a fixed-price bid included with the proposal, and it is one of the factors considered by the buyer.

The selection is followed by contract negotiations and culminates in a signed deal sealed with a substantial down payment. There is a champagne celebration, backslapping all around and a great sigh of relief that the "hard part" is finally over.

But the fun hasn't even started, because now the systems analysts from hell show up to do the specifications for the custom modifications, knowing full well that their salespeople have sold them down the river to get the business. And nobody paid enough attention to exactly what those "little itty-bitty changes" were supposed to do.

So we have the users on one side of the table and the analysts on the other, and they proceed to beat the daylights out of one another until finally one side or the other decides they would like to back out of the deal.

The vendor can't do that easily. They've already committed the sale to management (and, unless you've ever worked in marketing, you cannot imagine what it's like to tell management you've blown a committed sale), they don't want the competition to get the business, they could do without the bad press and, besides, they've got a contractual commitment to proceed.

The customer can't back out very easily, either. The vendor has its down payment and isn't very likely to give it back, they've already committed to their own management, they need the system badly and the users are already screaming over how long the selection took. This situation is commonly known as a Mexican standoff and is resolved either by compromises that please nobody or in court, which also pleases nobody. But there is a better way.

In the traditional procedure, you are signing an agreement without knowing what it is that's to be delivered. At best, the vendor's bid is a guess, based on both its necessarily limited understanding of the requirements and its desire to keep the bid competitively low.

Making the RFP more specific is not a solution, since an RFP for a package ought to be fairly general, in order not to artificially preclude an otherwise qualified vendor based on an arbitrary or cosmetic requirement.

A much better idea is to award the business provisionally, with no money changing hands, and craft a smaller and simpler contract for the specs only. The contract should contain a provision for a technique that Dick Bernacchi, noted computer law attorney at the firm of Irell & Manella in Los Angeles, calls "rolling estoppel." The objective of this concept is to afford some level of assurance that the vendor's price at the end of the specs process is about the same as it was in the original proposal.

With rolling estoppel, the vendor is obligated on a "rolling" basis to immediately flag any perceived changes in scope that arise during consultations with users. When that occurs, there are several possible courses of action:

- The customer can agree that the scope has changed, request an estimate of the financial impact and agree to an increase in the vendor's price.
- The customer can agree that there was a scope change but elect to omit the feature.
- The vendor can agree that the feature was clearly intended in the original RFP and concede the point.

If the vendor fails to flag a perceived scope change immediately, the contract should indicate that the vendor will provide the feature at no additional cost to the customer.

In this way, by the time the specs process is concluded, there should be no surprises regarding the price.

Of course, it is still possible that a disagreement over a scope change could wreck the deal, but under this technique there is no breach of contract, no forfeited down payment, no hat-in-hand begging to the "losing" bidders. The vendor is made whole for its time, and the customer keeps the specs generated thus far which, while not perfectly usable for the next vendor, will probably prove useful in better explaining what is needed (and what got misinterpreted on the first go-round).

However, it is not likely that the process will break down. As there is no sale yet, everyone is highly motivated to cooperate. The vendor salespeople are still around, because they only disappear after the sale is final. The users try to play ball, because they only get irrational when they've got a vendor contractually committed to a fixed price. The systems analysts behave because the only thing worse than a salesperson blowing a sale is a technical person blowing it solo.

Customer management will be committed because they really need the system, which is why they started all of this in the first place. The most cooperation between two sides exists when someone is trying to sell someone something.

Contracting separately for the specs is a way of eliminating contention by essentially prolonging the sales cycle until the definition of what is being sold is finalized. In fact, negotiating the main deal while the specs process is going on is a good way to further ensure that both parties will eventually come to a workable agreement.

Gruenfeld, a management consulting partner in the Los Angeles office of Touche Ross & Co., specializes in computer-related legal matters, including contracting and litigation.

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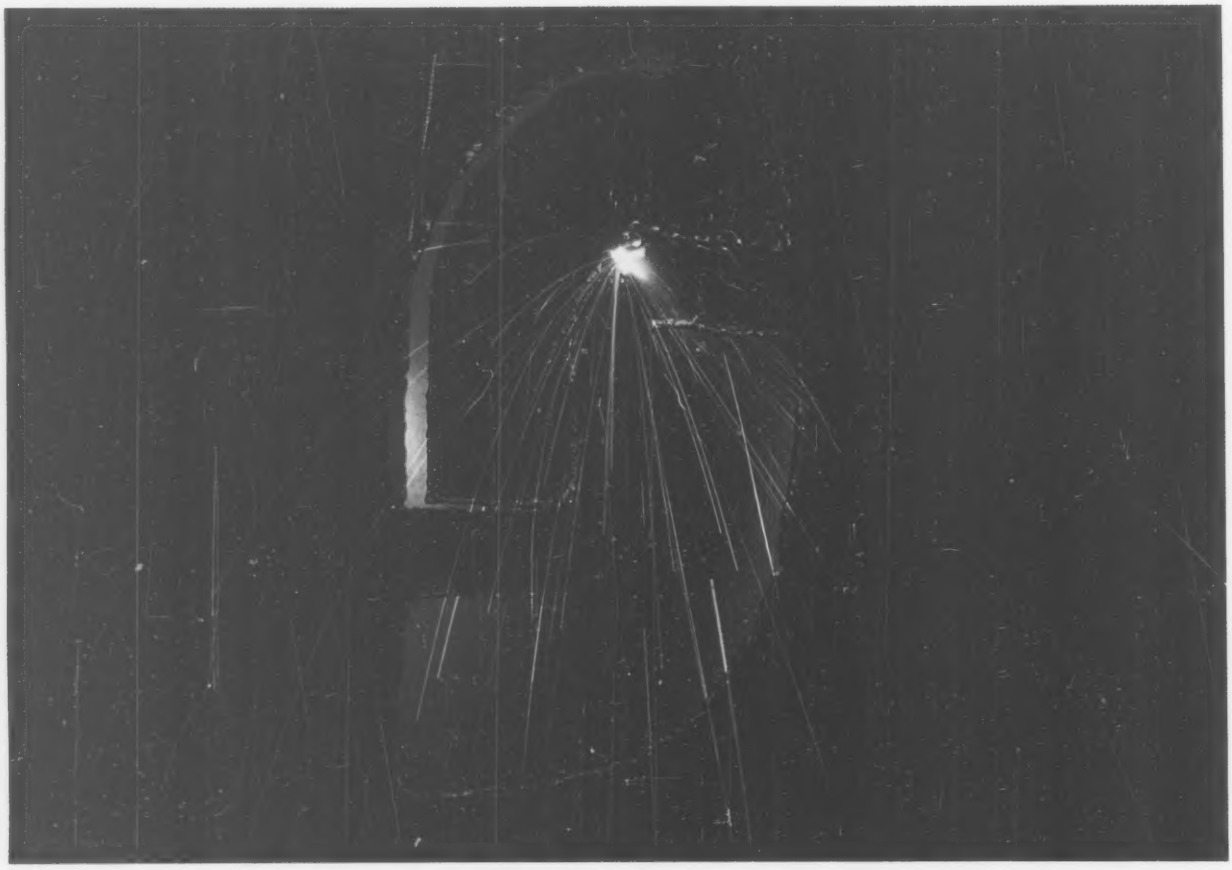

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SOFT TALK

Steven Pfrenzinger

CASEing the Cobol joint

One of the brightest aspects of computer-aided software engineering (CASE) lies in its ability to relieve the burden of traditional maintenance of Cobol systems. For many organizations, maintenance can consume up to two-thirds of their IS budgets.

The use of CASE for re-engineering Cobol applications will bring substantial productivity and quality improvements to the areas that consume the majority of the IS budget, freeing money for new development.

It will also make the re-engineering process itself an appealing new career opportunity for many programmers and analysts on the lookout for interesting and challenging new assignments.

Re-engineering activities follow four basic steps: code analysis, code restructuring, reverse engineering and major upgrades.

The brief definitions below will help put these steps into perspective.

• Code analysis. Prior to making any decision to re-engineer a system, the Cobol code must be analyzed to determine its condition.

Products that address this can indicate how well-structured and how complex the code is and give general ratings on maintainability and testability. These measures can be applied either to individual programs or an entire portfolio of programs. They help in estimating

Continued on page 32

Supercomputer flies Northwest

ON SITE

BY ELLIS BOOKER
CW STAFF

ST. PAUL, Minn. — Pilots. Planes. Flight plans. A supercomputer now handles the task of matching each to the others at Northwest Airlines, the nation's fourth largest passenger airline and the first to use a supercomputer for flight-plan scheduling.

Like its competitors, Northwest, based here, faces a daunting scheduling job. Its 5,200 pilots and 7,000 flight attendants make about 1,300 trips daily, flying 315 planes to 135 destinations.

This logistical nightmare is a significant cost item, too. Crews are an airline's second highest operating cost (after fuel). Efficiently scheduling crew assignments — until 1982 this was done manually at Northwest — also promises to cut down on what Northwest calls the penalties it pays its pilots and flight attendants for nonflying hours during layovers and connections.

The $1.5 million Convex Computer Corp. C220 air-cooled

supercomputer, which went into production June 15, was selected over a faster but more expensive supercomputer from Cray Research, Inc., according to Northwest officials.

"We feel the Convex has paid for itself in four months," said Elroy Olson, director of crew utilization, a department within flight operations at Northwest. Use of the new processor has already saved 1.2% on "penalties" paid in the DC9 fleet, Olson said.

The essential advantage of a supercomputer, Olson explained, is that it can process a great number of possible flight plans and thus optimize the schedule of the fleet. "Basically, we get four times more iterations than before," he said, referring to the two Unisys Corp. 7040s that previously handled the scheduling application.

The C220 runs through an initial schedule generated by Northwest's marketing department that dictates dates, times, cities and aircraft types. It must examine these parameters and link them with available Northwest personnel, taking into account myriad factors, including hotel costs, crew layovers, per diem expenses, contract work rules, federal regulations and, of course, the timing of connecting flights.

For application software, Northwest uses a Unisys package called APPL, or Airline Pairing Planning System. Northwest uses its own version of APPL's source code.

The C220 then generates a set of "legal" trips, those that best match people to planes but also ensure compliance with federal and company regulations, such as the Federal Aviation Administration requirement that limits total flight time to eight hours in any 24-hour period.

After the monthly flight plans are posted, pilots bid among themselves for the routes according to seniority rules. Output from the supercomputer also

Continued on page 32

Oracle stumps for financial software vote

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Oracle Corp., seeking to capitalize on the government's effort to upgrade and standardize its accounting systems, announced last month that it has adapted its financial software package to comply with federal accounting standards.

Oracle Government Financials is an integrated family of accounting modules based on Oracle Financials, a commercial-sector product line introduced a year ago [CW, Oct. 3, 1988]. Oracle is based in Belmont, Calif.

The Oracle announcement comes at a time when federal agencies are beginning to modernize their old accounting systems in accordance with the Joint Financial Management Improvement Program (JFMIP), an interagency initiative to standardize federal accounting systems.

Fed bedfellow

Oracle's primary competitor in the government market will be American Management Systems, Inc. (AMS), an Arlington, Va.-based firm that has a long history of supplying accounting software to federal, state and local agencies.

"AMS is a heavyweight . . . but it's still a wide-open market," said Larry G. Willets, software analyst at IDC Washington, Inc., a market research firm in Vienna, Va.

Willets said Oracle will have a competitive advantage because its software is portable to a variety of hardware platforms — the AMS system is geared for IBM mainframes — and because some agencies are dissatisfied with the performance of the AMS software.

However, according to Willets, Oracle's "biggest battle is going to be the same as AMS', and that's to convince agencies to go with an off-the-shelf package rather than custom work."

The initiative began during the Reagan administration out of concern that federal financial systems are fragmented and antiquated. A November 1988 report by the U.S. General Accounting Office said federal systems are "second-rate" and "fail to produce the complete, timely, reliable financial data needed for policy-making and day-to-day operations."

So far, only two vendors, AMS and Computer Data Systems, Inc. in Rockville, Md., have had their financial packages certified as meeting the JFMIP's Core Financial Systems

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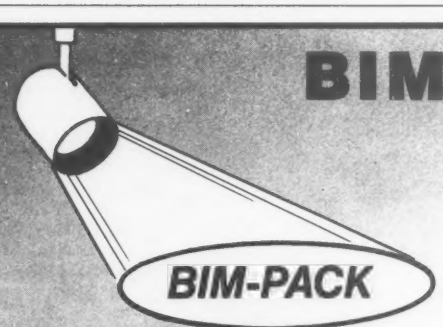
Inside

• Conference clears up CASE mists. Page 31.
• Rivals unveil dueling memory products. Page 31.
• Abu Garcia hopes to hook customers with new system. Page 34.

BIM Spotlight



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AD/Cycle fuels CASE interest

But conference-goers frustrated at inability to find, implement tools

BY JEAN S. BOZMAN
CW STAFF

MONTEREY, Calif. — IBM's AD/Cycle announcement on Sept. 19 has boosted corporate America's interest in computer-aided software engineering (CASE), but users attest to having trouble finding — and implementing — new CASE tools for their information systems organizations.

The confusion and frustration surrounding CASE was outlined during a three-day user conference sponsored by the Bellevue, Wash.-based CASE Research Corp. two weeks ago. Speakers said the AD/Cycle announcement will spur use of CASE and lessen confusion by defining standards.

"We're in a transition state," said conference keynote speaker Daryl Conner, president of ODR, Inc., an Atlanta management consulting firm. "Everything is academic if the proponents of CASE don't get sponsors."

Conner explained that, while the implementation of CASE initially seems like a technical matter, it actually requires a deep understanding of personnel matters. Conner said that many programmers are clearly distressed by the fear that their job may be diminished — or complicated — once a company buys CASE tools. If the programming team does not buy into CASE, productivity gains promised by vendors will not materialize.

Sponsors of CASE, whether they are end users, members of senior management or IS staffers, are essential if CASE is to make a dent in the backlogs that stem from traditional software development. "Don't stop at being technically competent," Conner warned his audience of 150 CASE users. "Focus on orchestrating human variables to get your job accomplished."

Conner's theme was underscored by CASE Research Chairman Vaughn Merlyn, who said end users have, in many cases, beaten reluctant IS teams to the punch when it comes to buying CASE tools. "We have found that the people who work with the data are often more receptive to CASE than the programmers themselves," Merlyn said.

Users who spoke at the conference agreed that the initial planning stage is critical to the success of any CASE project.

John Voss, a project manager at Huntington National Bank in Columbus, Ohio, described a rocky start in using CASE tools to revamp the bank's on-line transaction processing system. He attributed the initial difficulty to his team's unclear understanding of how CASE tools would change the code-production process.

"Certainly, we overestimated the project's maturity," Voss said. "I call this the Star Trek syndrome. It's going where no one has gone before." However, once the project was under way, a midcourse correction was made, giving programmers more time to climb the CASE learning curve, Voss said. CASE, they found, changed the skill set required for successful implementation. "The people with the best analytical and communications skills became the leaders in the project," Voss said.

CASE's Merlyn *says end users are receptive*

Dave Wells, manager of software development at Washington State University in Pullman, Wash., said his team strives for elegance in software design, combined with small software modules. The approach, Wells said, has allowed CASE development projects — based on Software AG's Natural language product — to outpace traditional Cobol development.

"If one piece of code no longer meets our needs, we throw it away and write a new one," Wells said.

Voss said he believes the critical factors leading to his bank's CASE success were the following: sponsorship by project leaders, a good working relationship with Texas Instruments, Inc. — the bank's CASE vendor — and a long testing period before the cutover to a production system.

The project built a system that feeds banking transaction data to IBM's DB2 database manager, which resides on the firm's IBM 3090 Model 300E mainframe, Voss said.

EMC, Cambex race to unveil IBM 3090 memory boards

BY ROSEMARY HAMILTON
CW STAFF

EMC Corp. and Cambex Corp., rivals in the IBM 3090 memory market, both announced availability of memory products for IBM's top-of-the-line mainframes, the S series.

Both companies said pricing for S model central storage and expanded storage memory boards will be the same as the pricing for both 3090-based models and E models. Currently, EMC prices start at $180,000 for 32M bytes of central storage and $97,500 for 64M bytes of expanded storage. Cambex charges $210,000 for 32M bytes of central storage and $105,000 for 64M bytes of expanded storage.

In typical fashion, the two companies tried to outdo each other with their announcements. EMC was first with an announcement of availability. Cambex followed up a week later to say that its S model memory boards were not only generally available but had been installed at several user sites. It declined to name those sites, however.

EMC said the memory products have just become available for the S models because they required some modifications to work with the highest performance IBM mainframes. For example, the company had to change the board's logic to accommodate the processor speed change. The S models, which began shipping a year ago, run at 15 nsec, while the E models clock in at 17.2 nsec.

The two companies have been actively marketing memory products to 3090 users for nearly a year. The market is viewed as a difficult one because many 3090 shops are reluctant to do business with any vendor other than IBM when it comes to mainframe products.

Nexpert, Gemstone bridged

BY ROBERT MORAN
CW STAFF

Bowing to the demands of government contracts, Servio Logic Development Corp. and Neuron Data will bridge expert system and object-oriented databases.

The interface will allow systems developed in Nexpert Object — a rule- and object-based expert system development and delivery tool from Neuron Data — to store and retrieve data in Servio Logic's Gemstone object-oriented database.

Mike Connell, general manager of database systems at Servio Logic, said other systems destroy the object format as it is stored — which "requires developers to reconstruct the object format whenever it is moved."

By allowing developers to maintain the object format, Connell said, "the bridge will lessen the amount of code needed for applications development."

The interface will cost approximately $700 and is scheduled for beta testing in the fourth quarter of this year.

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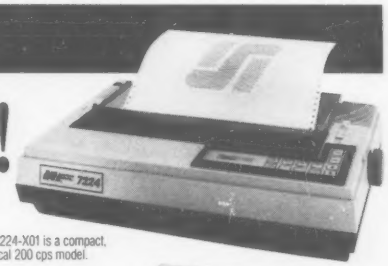

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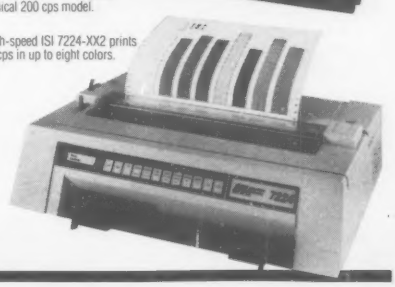

Pfrenzinger

CONTINUED FROM PAGE 29

the re-engineering effort, selecting candidates for re-engineering or simply in getting a better picture of the current quality of the code. In some cases, this analysis may suggest that some or all of the code should skip code restructuring or even reverse engineering.

When no major re-engineering is anticipated, an "intelligent editor" may save programmers' time in analyzing Cobol programs.

• Code restructuring. If the code analysis indicates that some or all of the programs are unstructured or very complex, Cobol code restructuring products offer great potential benefits. They essentially read this unstructured and often complex spaghetti code and automatically (in most cases) produce top-down, structured code that is far easier to understand and maintain. Because they resolve many structured design and programming violations, restructuring code is often a preconditioning for reverse engineering.

Cobol restructuring products address the procedural code but not the data issues — data name rationalization, building a dictionary, migrating to a different database management system, etc. If the data used in an existing system is the primary problem, then a product geared specifically to data issues may be more appropriate at this point.

• Reverse engineering. Reverse engineering is the translation of an end product — in this case, Cobol source code — back into its design-level representations. The translation process extracts the program's structure, content and meaning and stores those in the high-level format of a CASE repository. This means elevating the procedural logic, data definitions, end-user interfaces and the overall system architecture into a more abstract and understandable format.

These high-level representations can take many forms, including data-flow diagrams, stucture charts, action diagrams, data models, control flow graphs, screen and report images and many more.

Once this information is stored in a repository, systems documentation can be generated or compilable source code can be generated, or both. The abilities to maintain and document systems at this higher level are benefits of CASE.

• Major upgrades. The objective of re-engineering is to make significant enhancements to existing systems. Toward that goal, the previous three steps have laid the groundwork.

These enhancements are easier to apply to the existing Cobol system after it has undergone a comprehensive code analysis, a transformation via code restructuring or has been reverse-engineered into a CASE environment. Major upgrades include significant functionai enhancements, moves to on-line or database environments, changes in hardware or software platforms and performance optimization.

Pfrenzinger is a CASE industry consultant with IMS Consulting, Inc., a Northridge, Calif.-based company specializing in IMS, CICS, and DB2-related subjects.

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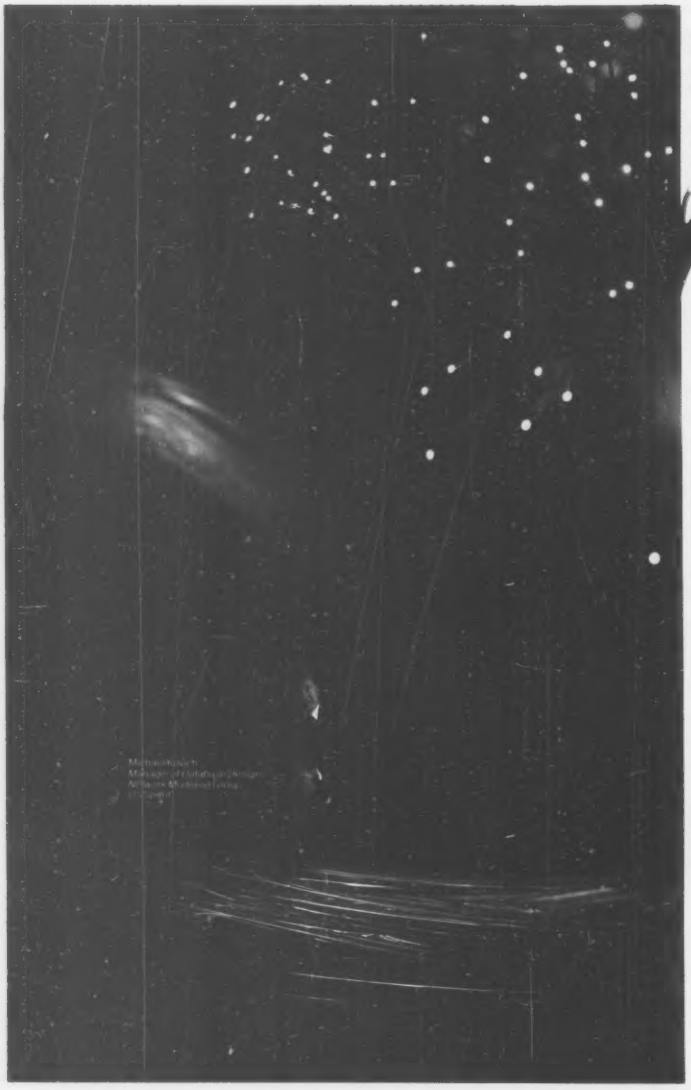

How does the US Sprint network modeling group keep track of some 25 billion call-minutes a year? Quite simply, in split seconds with System 1032 from CompuServe Data Technologies.

Using System 1032 4GL/RDBMS VAX software, the US Sprint network modeling group created an extensive network modeling system that increased the speed and efficiency of its work in forecasting and planning for the growth of US Sprint's vast fiber-optic communications network.

Think Big. "The total breadth of the data that System 1032 can handle on our network performance is of a staggering magnitude," said Michael Kovich, manager of database design.

Network performance data alone amounts to more than 1.5 million bytes a day, 365 days a year.

Think Fast. "What's important to us is that this mass of data be assessed and made available every morning like clockwork. So the software system's efficiency, reliability and quality help us meet our goals and objectives using the most up-to-date information."

Ease of use in the VAX environment and its host language interface are additional pluses for System 1032.

According to Kovich, "System 1032 was far easier for us to learn and also much quicker in what we wanted it to do. The first time we used it, we were building datasets within 30 minutes."

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Northwest

CONTINUED FROM PAGE 29

feeds statistical analysis subsystems used by management, as well as an automated hotel reservation system, which resides on a Unisys 1100 mainframe and books rooms for thousands of crew members.

Even a supercomputer, however, cannot manage all the possibilities for a single plane on a particular day.

"If you take a particular DC9 schedule [there are 125 of those jets in Northwest's fleet], solve it for a day of the month and generate legal trips, the set is on the order of several hundred billion," said Julie Ludvigsen, schedule development analyst at Northwest.

Ludvigsen added that she and her colleagues have done experiments solving a set with one million possibilities, which took 13 hours to generate the pairings for the APPL's solver.

> "IF YOU TAKE A particular DC9 schedule [there are 125 of those jets in Northwest's fleet], solve it for a day of the month and generate legal trips, the set is on the order of several hundred billion."
>
> JULIE LUDVIGSEN
> NORTHWEST AIRLINES

To get around this "infinite set" problem, APPL looks at a subset of planes and possibilities and runs this as an iterative process. "Right now, there's no technology out there to solve the entire set," Olson said.

Nevertheless, Northwest is examining new vector-based math algorithms to enhance the scheduling system and has vectorized some existing code using the C220's compiler.

Other airlines are said to be considering supercomputers for scheduling jobs. American Airlines, for example, has looked into using supercomputers and parallel processors for various "strategic applications," an airline spokesman confirmed.

Oracle

FROM PAGE 29

Requirements. Oracle and several other accounting and software firms are gearing up to join them on the list and take advantage of the growing market for federal financial software, said James F. Kerrigan, an analyst at the Vienna, Va., office of Input, a market research firm.

"This represents a big opportunity for these companies, not because they make that much money on the software packages but because of the inevitable tailoring and consulting work that goes along with the software packages," Kerrigan said.

Company officials claimed that the Oracle Government Financials package allows for distributed processing and will meet stringent government requirements for funds control, budget preparation and accounting procedures.

Real-time funds control

The package provides on-line, real-time funds control — rather than the batch systems used now in many agencies — and can be used without reading the documentation, according to Oracle Senior Vice-President Jeffrey Walker.

The government accounting modules are immediately available on Digital Equipment Corp. VAX/VMS processors and several Unix processors. Pricing varies depending on the type of computer, ranging up to $200,000 per module for a mainframe system.

In another recent announcement, Oracle introduced a set of applications aimed at the industrial sector. The applications include inventory, bill of materials, work in progress, master scheduling, manufacturing resource planning and order entry. They are initially available for DEC VAX, Sequent Computer Systems, Inc. and Pyramid Technology Corp. platforms.

HARD BITS

Touche Ross, Unisys unite

Unisys Corp. and **Touche Ross & Co.** formed an alliance to provide large-scale commercial systems integration services. The team did not announce any clients yet but said that both firms will solicit business and then determine which company is suited to serve as primary contractor on the deal.

Unisys also announced that it has teamed up with **Access Technology, Inc.**, which sells the spreadsheet software package 20/20. Access, which will serve as a Unisys marketing associate, will work with Unisys on joint sales and marketing efforts. In addition, the two companies announced plans to enhance and develop products for mutual customers and prospects.

Tandem Computers, Inc. and the **Westinghouse Electric Corp.** Electronic Systems Group said they will jointly provide integration products and services. The companies plan to offer customers systems integration services, business planning, applications re-engineering and software development support services.

Sequoia Systems, Inc. and **The Ultimate Corp.** signed a deal that calls for Ultimate to resell Sequoia fault-tolerant computers. The partnership calls for representation on each other's board of directors. Ultimate will hold exclusive worldwide sales rights for Sequoia's Pick-based systems, an operating system developed by Pick Systems, Inc.

Andersen Consulting, a division of Arthur Andersen & Co., will serve as a systems integrator for **Filenet Corp.**, a maker of image processing systems. Andersen will offer the Filenet line of document-processing products, including the company's Unix-based systems and Workflo software package.

IPL Systems, Inc. said it recently signed two European distributors to market memory and tape products. GUWA Computer Systems Vertriebs GmbH in West Germany will sell memory and tape subsystems.

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Abu Garcia lands its better ordering system

ON SITE

BY MARYFRAN JOHNSON
CW STAFF

FAIRFIELD, N.J. — At the U.S. headquarters of one of the world's largest fishing equipment manufacturers, "the one that got away" had better not be a customer order.

Abu Garcia, the company that fathered innovations such as the "stainless steel worm gear drive" and "centrifugal spool braking system," prides itself on keeping pace with the needs of 60 million sport fishermen.

Five years ago, faced with clogged distribution channels and a sluggish order-tracking system, the company changed its marketing strategy and overhauled the computer system at its North American headquarters.

Abu Garcia *uses new tracking system to reel in customers*

Since then, it has twice upgraded its host CPU and has recently added its first electronic data interchange (EDI) application. To move in closer to its customer base, Abu Garcia, the American subsidiary of the Swedish-based AB Urfabriken, cast off an old Data General Corp. Nova minicomputer and reeled in a Hewlett-Packard Co. 3000 to process all business operations.

The lone HP Model 42XP, with nearly 2G bytes of hard-disk space, serves 10 personal computers, 12 terminals and two modem lines as well as another pair of terminals in the company's Canadian office in Toronto.

"As with any retail industry, if you don't have it on the shelf on time, you don't sell it," said Jerry Gomber, international business manager for Abu Garcia.

Rather than selling its 6,000 different fishing products through a middleman wholesaler and 100 distribution centers, the firm began dealing directly with 2,500 retail stores.

Today, Abu Garcia rods and reels dominate the "fishwares" departments at more than 2,000 K Mart and Walmart discount stores — both of which are Abu Garcia partners in the EDI project — plus hundreds more retail outlets of Munson Sporting Goods, Bass Pro shops and Herman's World of Sporting Goods.

The resulting improvements in processing speed, reliability and inventory control helped to send annual sales of $10 million in 1983 upstream to $50 million this year.

The company doubled its staff to 100 employees and nearly quintupled its customer/order transactions from 300 to 1,400 daily, said Elizabeth Voorhees, data processing manager at the company.

"Before these changes, we had a distorted view of where our sales and profits were," she said. "It was very hard to know which products were making money and which ones were losing money."

A key factor in choosing the HP machine was its ability to run Boss/3000, an integrated business operations software package from Satcom in Virginia Beach, Va., Voorhees noted.

Both K Mart and Walmart recently began placing their orders with Abu Garcia through an EDI communications link.

"Now we don't have to exchange paper purchase orders or invoice documents with them anymore," Voorhees said. "Internally, they put their purchase orders into batches on their own system, and we get the batch when we call. As due dates come up, we ship the products and bill on invoice."

Using the EDI standard is especially useful, she added, because it removes the need to rewrite the software every time the customer companies change their own internal purchase-order format.

To generate customized production reports and market forecasting information, the company also added the Quiz software package from Cognos Corp. in Peabody, Mass.

"The computer lets us know what's happening up to the minute," Gomber said. "Speed is a key benefit. It lets us react more efficiently to the market."

Company managers are still trying to find ways to integrate past and current product demand with advance forecasts and to more accurately identify which products are selling below expectations, he said.

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Southeast: (800) 241-5841, (404) 925-7980 • London: 011 44 923 897 000. © Leasametric, Inc. 1989

NEW PRODUCTS — SYSTEMS

I/O devices

Metacomp, Inc. has announced a graphics display system that features MIT's upgraded X Window System.

The X Server, Version 11 is reportedly designed to reside in firmware on the company's 1280V-GDS color graphics subsystem based on Motorola, Inc.'s VMEbus. The 1280 Colorware family provides 1,280- by 1,024-pixel resolution in either 16 or 256 simultaneous color versions from a palette of 16.7 million, according to the vendor. Quantity pricing for the 1280-GDS dual-board set for 16 or 256 colors is listed at $3,823 and $4,897, respectively.

Metacomp
15175 Innovation Drive
San Diego, Calif. 92128
619-673-0800

Applied Digital Data Systems, Inc. has expanded the disk drive storage capacity available on its Mentor 6000 Model 2 (DSS2) external disk subsystem.

The DSS2 is reportedly available with up to two 5¼-in. 380M-byte disk drives, allowing for a subsystem capacity of 760M bytes and a total storage capacity on the Model 2 of over 1G byte. Functionally compatible 172M-byte disk drives for the DSS2 are also available, and field upgrade kits for adding the 380M-byte drives to existing 172M-byte subsystems will be supplied, the company said.

A DSS2 subsystem with a single 380M-byte drive costs $16,620.

ADDS
100 Marcus Blvd.
Hauppauge, N.Y. 11788
516-231-5400

Saratoga Semiconductor Corp. has announced three static random-access memory devices with the transistor-transistor logic I/O interface. Called SSM6116, SSM6168 and SSM6170, the 16K-bit density devices with an access time of 12 nsec are reportedly designed for applications such as cache memory, graphics buffer and look-up table and writeable control store. Said to provide upgradability and be functionally compatible, the devices are offered in various industrial packages with prices starting at $20.80 in quantities of 1,000, according to the company.

Saratoga
686 W. Maude Ave.
Sunnyvale, Calif. 94086
408-522-7500

Eakins Associates, Inc. has announced an 8mm helical-scan tape subsystem with a data storage capacity of up to 2.3G bytes. The Minimax Model 1P reportedly supports Digital Equipment Corp.'s Microvax II and III, Sun Microsystems, Inc.'s Sun-3 and -4 and other computer families that use a Pertec interface. Capable of being daisy-chained with existing tape drives, the subsystem can also connect via Eakins' Tape Share switch to multiple CPUs. The subsystem is available in desktop, pedestal and 19-in. rack-mount versions with a choice of controllers for a price beginning at $4,995.

Eakins Associates
67 E. Evelyn Ave.
Mountain View, Calif.
94041
415-969-5109

Emulex Corp. has announced a series of disk storage arrays designed for plug-compatibility with Digital Equipment Corp.'s RA series drives.

The arrays reportedly utilize DEC's Standard Disk Interface architecture and incorporate the Emulex 8-in. Standard Disk Drive. They are offered in three standard configurations: a pedestal unit with one to four drives providing 663M bytes to 3.49G bytes of formatted storage; a 42-in. unit for as many as 12 drives, providing up to 10.47G bytes; and a 60-in. enclosure containing as many as 18 drives and as much as 15.7G bytes of storage.

Pricing ranges from $11,644 to $226,396, depending on configuration.

Emulex
3545 Harbor Blvd.
Costa Mesa, Calif. 92626
714-662-5600

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NEW PRODUCTS — SOFTWARE

Database management systems

On-Line Software International, Inc. has enhanced Proedit, its application testing product for IBM DB2 database systems.

Release 4.0 reportedly provides a logical compare of DB2 tables, load command and browse and zoom functions. The software supports Version 2.1 of DB2 and is downward compatible with previous releases of DB2, according to the vendor. Proedit 4.0 is available for a one-time CPU license fee of $25,000.

On-Line Software International
2 Executive Drive
Fort Lee, N.J. 07024
800-642-0177

The Relational Strategies Division of Computer Horizons Corp. has announced Version 5.0 of the Migradata DB2 Data Dictionary.

According to the vendor, interfaces to third-party computer-aided software engineering tools allow Migradata to act as a repository of data from the initial modeling stages through the support of application generators. The product was designed as an IBM DB2 application and reportedly will interface to IBM's repository when it becomes available.

The Migradata DB2 Data Dictionary Version 5.0 is priced from $42,000.

Computer Horizons
747 Third Ave.
New York, N.Y. 10017
800-847-4097

Development tools

Top Level, Inc. has announced a parallel Common Lisp system specifically designed to support programming on a shared-memory multiprocessor computer.

Called PICCL, for parallel implementation of concurrent Common Lisp, the product supports programmer-specified parallelism at multiple levels, from large-grain to fine-grain, the vendor said.

PICCL is now available for Sequent Computer Systems, Inc. Symmetry and Encore Computer Corp. Multimax shared-memory multiprocessors. It sells for $3,000 per processor.

Top Level
196 N. Pleasant St.
Amherst, Mass. 01002
413-256-6405

A Few Good People, Inc. has enhanced its CICS database manager designed for VSAM, DL/1 and IMS/DB environments.

Release 4.0 of DBDS is said to provide several troubleshooting features, including on-line scanning capabilities for damaged pointers and special security for pointer functions. It is primarily aimed at CICS application programmers, and a single CPU license is priced from approximately $3,900, depending on configuration. Site licenses and leasing options are also available.

A Few Good People
P.O. Box 152
970 Crest Estates Drive
Crest Park, Calif. 92326
714-337-3928

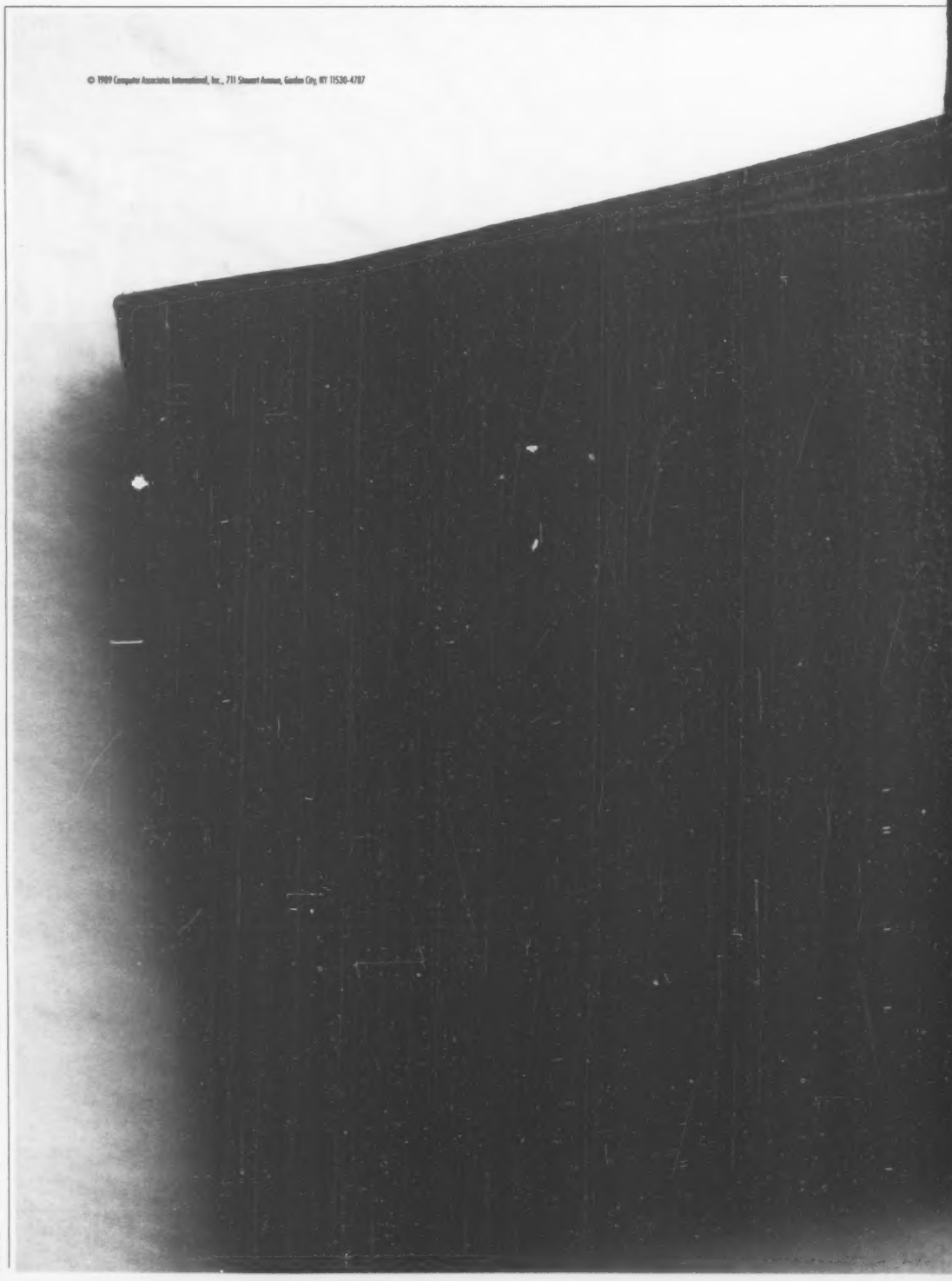
Applications packages

Nixdorf Computer Corp. has announced a document image processing package for use with its line of AT&T Unix System V-based Targon host systems, particularly the 35, 31 and 386 models.

The DCPA Image products permit documents to be displayed, modified, enlarged, reduced, printed and communicated to other systems. The software also handles document imaging and incorporates a database to reference image records on shared storage devices. Pricing starts at $20,000.

Nixdorf
300 Third Ave.
Waltham, Mass. 02154
617-890-3600

Alliant Computer Systems Corp. and The Mathworks, Inc. have jointly announced a parallel processing version of the Matlab software package developed



specifically for the Alliant FX/Series and Visualization series supercomputers.

The software package combines numerical analysis, matrix computation, signal processing and two- and three-dimensional graphics with an interface in which problems and solutions are expressed in standard math notation, the vendor said. Pricing for the Alliant version of Matlab starts at $16,000.

Educational discounts are available.

Alliant
1 Monarch Drive
Littleton, Mass. 01460
508-486-4950

AGS Management Systems, Inc. has announced an automated project graphics system. Called Project Graphics, the software package was designed as a visual tool to assist in project management and planning functions. Features reportedly include logic network charts; Gantt charts; line, bar and pie charts; and histogram presentations. The package is priced at $32,000 and is available for both IBM mainframe and Digital Equipment Corp. VAX environments.

A version is also available for IBM Personal Computers and compatible systems.

AGS Management Systems
880 First Ave.
King of Prussia, Pa. 19406
215-265-1550

Ross Systems, Inc. has announced a cost allocations accounting software system for use on Digital Equipment Corp. VAX computers.

Developed in partnership with the internal information systems department of Microsoft Corp., the Cost Allocations System reportedly provides users with advanced, high-level rule definition techniques. This subsequently allows the use of more complicated allocation methodologies and reduces the overall maintenance of the allocation process, the vendor said.

The product is used with the Ross Renaissance Series General Ledger application to allow tracking and analysis of profitability.

Pricing for the system ranges from $9,000 to $15,000, depending on CPU.

Ross Systems
1860 Embarcadero Road
Palo Alto, Calif. 94303
415-856-1100

Utilities

Hancock Software, Inc. has introduced Filemaster, a file and directory management program designed for Digital Equipment Corp. VAX/VMS users.

The software reportedly places directory structure, file names, contents and attributes on the screen in a multiwindow display. Other features include point-and-shoot menus and file selection commands, the vendor said.

Pricing ranges from $495 to $7,950, depending on VAX CPU. Shipping was slated to begin last month.

Hancock Software
115 Watertown St.
Watertown, Mass. 02172
617-924-0017

A software program designed to provide VSAM monitoring, tuning, optimizing and modeling functions in an IBM MVS environment is available from Compute (Bridgend) Ltd.

Called Cblvcat, the product is now in Release 8.13. It reportedly requires no system hooks and allows users to include multiple catalogs in the same execution step, according to the vendor. Pricing ranges from $3,072 to $7,680, depending on CPU.

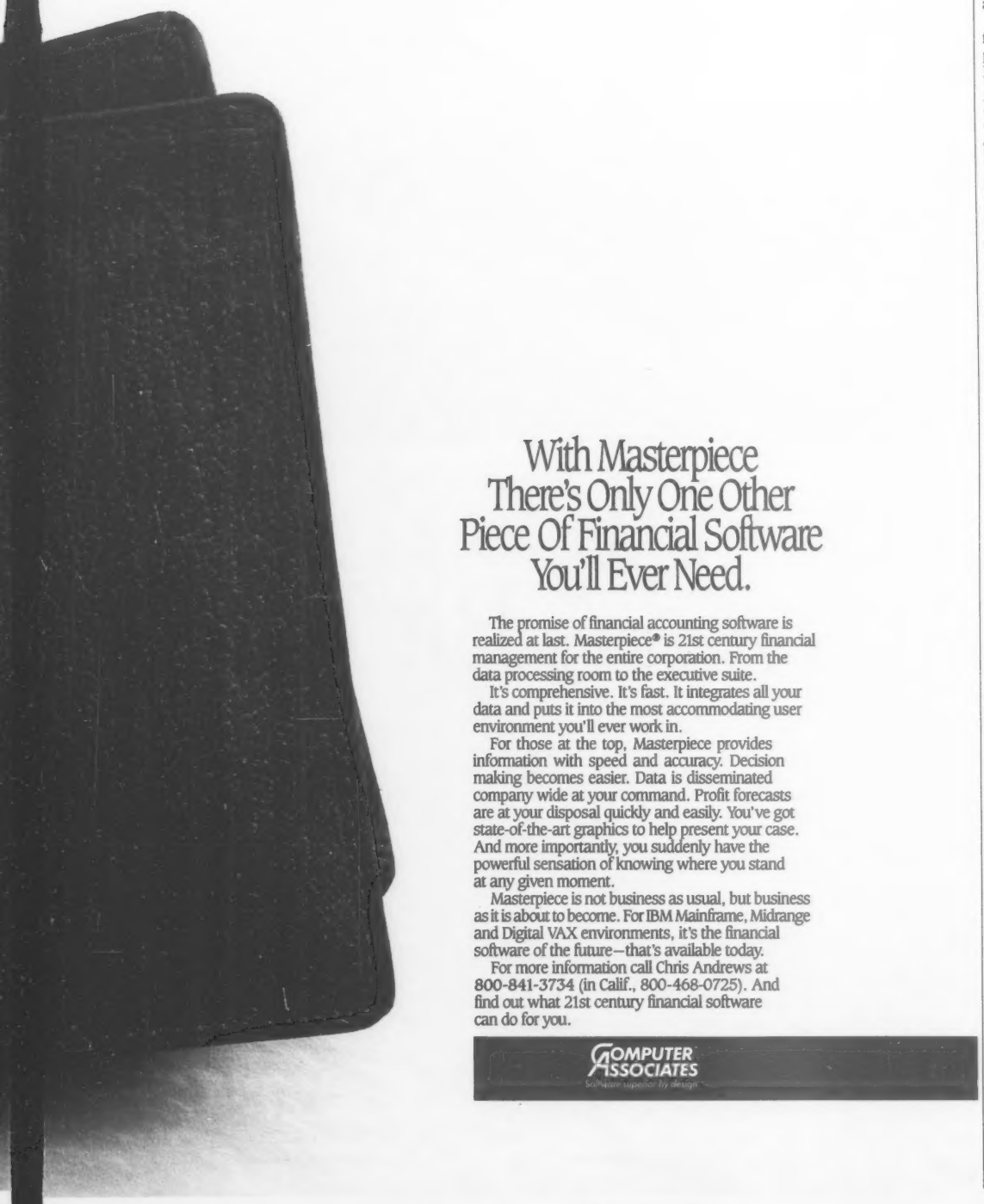
Compute (Bridgend)
38 Guilded Court
Rexdale, Ont. Canada
M9V 4K6
416-746-4447

Applied Software, Inc. has announced Almost TSO for TSO ISPF installations.

The software program reportedly enables offloading of TSO functions, such as edit, utilities, submit and JES ouput retrieval, to the Almost TSO multiuser VTAM environment.

It is available for IBM MVS, MVS/SP, MVS/XA and MVS/ESA systems and is priced from $12,000 to $22,000.

Applied Software
P.O. Box 13027
N. Palm Beach, Fla. 33408
417-626-4818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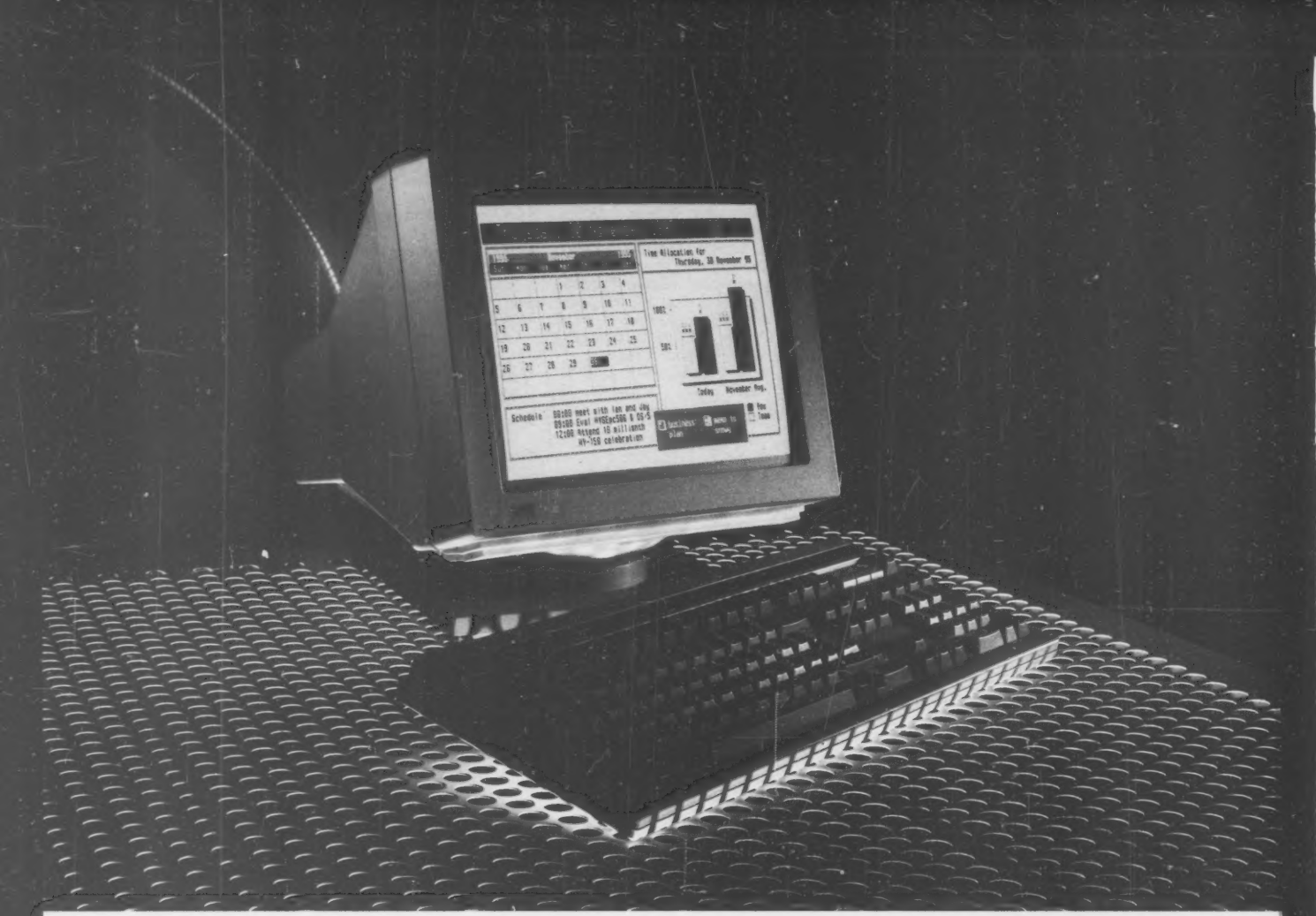
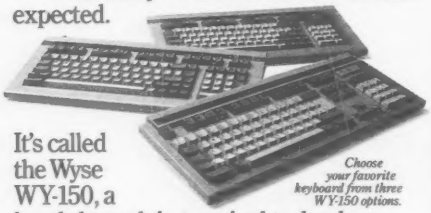


The Terminal Of The '90s Has Arrived A Bit Early.

Wyse introduces the WY-150. They always said there would be such a terminal "someday". It would have the flexibility and connectivity to operate in virtually any computing environment, while meeting the most exacting ergonomic requirements. And, it would deliver those advantages at an affordable price.

"Someday" is here much sooner than expected.



Choose your favorite keyboard from three WY-150 options.

It's called the Wyse WY-150, a breakthrough in terminal technology that will set price/performance standards for years to come.

Bridging the worlds of ASCII, ANSI and PCs, the WY-150 offers compatibility with a wide range of operating systems. Including UNIX/XENIX, MS-DOS, Concurrent DOS, PC-MOS, and PICK. With a choice of three keyboards. And typical of Wyse, the WY-150 does it all with stylish design at a price that's also attractive.

The WY-150 also sets new ergonomic standards. Its 78 Hz refresh rate eliminates any hint of flicker. Just as overscanning and a bezel that matches the soft, paper white phosphor erase distracting borders. (Amber and green phosphors are also available.) The oversize 10x16 cell makes each crisp character stand out vividly.

The WY-150 is also part of *SystemWyse*. It links effortlessly with Wyse PCs and multi-user platforms to create uniquely integrated and cost-effective solutions. Everything is designed, manufactured, and tested by Wyse to work together. And it's all backed by the service and support of the world's leading independent terminal maker.*

Only one question remains. Now that the terminal of the '90s is here, what are you waiting for? Call today for more information on the WY-150.

1-800-GET-WYSE

Wyse® is a registered trademark of Wyse Technology. SystemWyse and WY-150 are trademarks of Wyse Technology. Other trademarks/owners: UNIX/American Telephone & Telegraph; Concurrent DOS/Digital Research Inc.; PC-MOS/The Software Link, Inc.; PICK/Pick Systems; MS-DOS, XENIX/Microsoft. *IDC 1988 U.S. Terminal Census.

WYSE

We make it better, or we just don't make it.

MICRO BITS

Michael Alexander

Got the EISA intro blues

Well, it looks as though the eve of EISA is upon us. I'll bet the actual introduction of machines will be anticlimactic, bringing with it the sort of disappointment many children feel on Christmas morning when they find out that Santa Claus did not bring them a real pony or a rocket ship. Blame IBM for being the Grinch that stole the EISA holiday.

A couple of weeks ago, IBM put a flame to the Extended Industry Standard Architecture vs. Micro Channel Architecture (MCA) cold war with announcements of a series of impressive enhancements to MCA technology.

The company said that it will significantly boost the transfer data rate by a factor of eight and intensify MCA card development. According to IBM officials, the firm's new modes of data transfer — 32- and 64-bit Streaming Data Procedures — will shuttle data at 40M to 80M byte/sec. Eventually, they will be able to crank it up to 160M byte/sec.

In comparison, the 35M-byte/sec. data-transfer rate promised by EISA seems as slow

Continued on page 54

Workstation faithful tempted by IICI?

ANALYSIS

BY JAMES DALY
CW STAFF

Until recently, a workstation was relatively easy to define. Slap a 16/32-bit or full 32-bit CPU into a single-user system, add up to 16M bytes of main memory as well as graphics and text capability, gas it up to process one million operations per second or more and then sell it to the technical professional market.

Easy enough, right?

Wrong. The division between personal computers and workstations has become increasingly fuzzy. And the recent introduction of Apple Computer, Inc.'s high-powered Macintosh IICI as well as the plummeting workstation entry-level cost — best embodied by Hewlett-Packard Co. Apollo Division's $3,990 Series 2500 — has users from both camps streaming over the border faster than East Germans into the West.

Of the two machines, the Mac IICI may be the more interesting because of the industry changes it embodies. While the long-delayed Macintosh Portable was hogging the limelight, the IICI was drawing the shape of things to come. "With the IICI, Apple becomes a viable alternative to a workstation purchase," said Michele Preston, an analyst with the New York-based Salomon Brothers research firm.

With its 25-MHz Motorola, Inc. 68030 chip, the IICI escalates Mac performance to a new level. Its application-specific integrated circuits improve system throughput, and it comes with such standard features as a color video adapter.

Already, the IICI has become the apple of at least one workstation user's eye. Kim Arledge, microcomputer coordinator at the University of Texas in Austin, currently uses Sun Microsystems, Inc. workstations for the department's computer-aided design needs — but that could change. "The speed on the IICI is great, and I like the fact that we can stick with the Mac user interface while maintaining a high level of power," Arledge said.

The drawing card for the IICI is the way it goes above and beyond the call of typical PC capabilities, according to industry observers. For instance, the 25-MHz microprocessor makes the system up to 45% faster than the Mac IICX.

Continued on page 50

Edging upward

Apple's Macintosh IICI represents a threat to workstation vendors

Processors:
- Motorola 68030, 25MHz

Memory:
- 1M to 8M bytes RAM and 512K bytes ROM

Storage:
- Up to 80M bytes hard disk

Price:
- $6,269 with 1M bytes RAM and Apple Superdrive floppy disk; and $9,152 with 4M bytes RAM, 80M bytes hard disk and Apple A/UX.

SOURCE: APPLE COMPUTER INC.
CW CHART: JOHN YORK

IBM 80486 upgrade leads the pack

BY PATRICIA KEEFE
CW STAFF

Continuing to press the offensive against its desktop rivals, IBM last week announced initial deliveries of its Intel Corp. I486 processor upgrade a full quarter ahead of schedule and at least a month before competitors are expected to unveil 486 offerings at Comdex/Fall '89 in Las Vegas.

An IBM source said it would be reasonable to expect a 486-based computer shortly.

Two weeks ago, IBM worked quickly to defuse excitement over the upcoming introductions of Extended Industry Standard Architecture (EISA)-based computers, also slated for Comdex unveilings (see story page 51).

While IBM claims to be the first to ship a 486 product — in this case, the 486/25 Power Platform unwrapped in June — the competition should be hot on its heels.

ALR, Inc. has announced that its Powercache 4E, a 486-based computer featuring the EISA bus, will ship in early 1990. A 486 box with an IBM Micro Channel bus is set to ship in November; its 25-MHz I486 Powerflex upgrade is scheduled to ship later this month.

Although Compaq Computer Corp. has not announced any 486 plans, a recent Prudential-Bache Securities newsletter speculated that Compaq is readying a single-user 486 model configured with an AT bus as well as two server-workstations, each with an EISA bus. One model reportedly features dual 486 chips.

Spokesmen for AST Research, Inc., NEC Information Systems and NCR Corp. have said their companies will introduce 486-based computers before year's end.

AST will ship a 486 add-in card by the end of the month and will show a 486 box along with third-party 486 boards at Comdex/Fall '89.

Despite reports of flawed and delayed chips, an Intel spokeswoman said the ramp-up of "production-worthy" 486 chips is the fastest ever for the chip maker. Delivery is such that Intel can probably meet 80% of any request, she said. There are more

Continued on page 51

Inside

- Virus experts say, don't worry, be happy. Page 46.
- Grid portable has brawn, sensitivity too. Page 47.
- Freedom's just another word for voice-controlled workstation. Page 50.

Some folks think that COBOL, the language of the past, may also be the language of the future!

"Micro Focus COBOL for Presentation Manager has suddenly become the right language." . . . . . **BYTEweek, 6/19/89**

"And COBOL, the language everybody uses without admitting to it - also refuses to go gentle into the night of old technology. . . Micro Focus appears ready to bring the old-time language into the brave new world of graphical user interfaces." . . . . . **PCWeek, 6/5/89**

Micro Focus COBOL/2 Workbench Awarded 1989 Professional Solutions Award . . . . . **PC Tech Journal, 2/89**

"The COBOL/2 Workbench, available from Palo Alto based Micro Focus, Inc. is by far the most powerful and complete PC-based COBOL development and maintenance toolset. This package is the Cadillac of PC COBOL toolsets." . . . . . **System Builder Magazine, 1/89**

Micro Focus "ANIMATOR is a sparkling example of the reason why the PC-based COBOL workstation represents a quantum leap in programmer productivity." . . . . . **Database Programming & Design, 10/88**

"Could COBOL be the key to the success of OS/2?" . . **BYTEweek , 6/19/89**

Micro Focus Awarded Four Out of Four Ribbons for "Overall Value" in Readers' Choice Awards . . . . . **InformationWEEK, 4/24/89**

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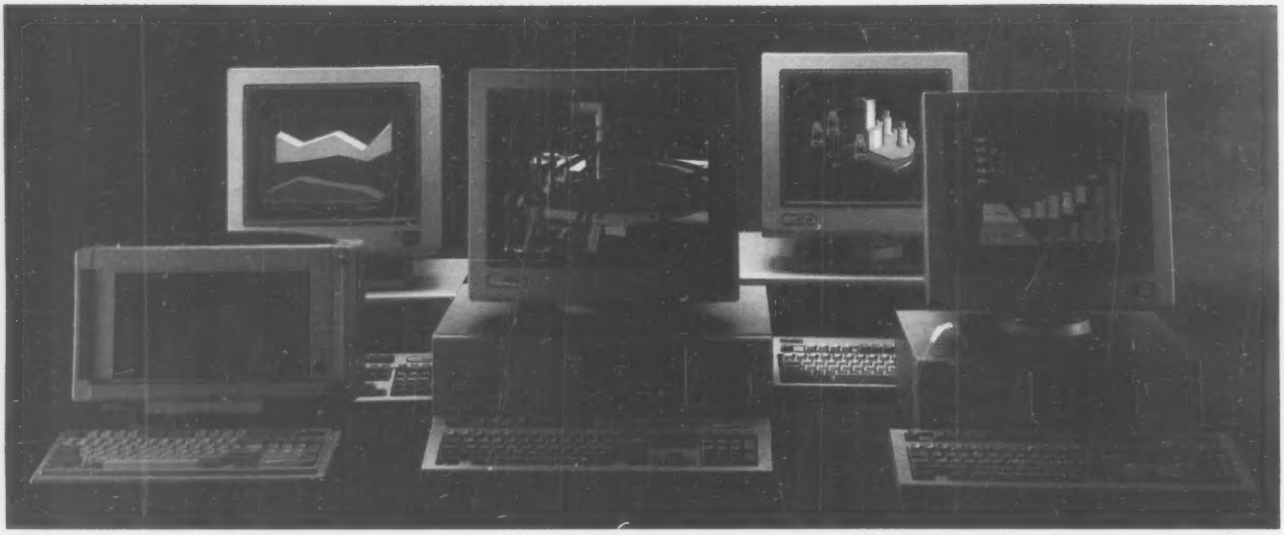

In 386 personal computing, you're looking at the most wanted list.

In 1986, Compaq introduced the world to personal computers based on the 386 microprocessor.

Since then, we've made it possible for every level of user to work with this powerful technology. In fact, more people work with COMPAQ 386-based PCs than any other 386s worldwide.

Today, Compaq offers the broadest line of these high-performance personal computers. Each delivers significant technological advancements developed by Compaq engineers. Each delivers optimum performance for the needs of different users. And each is built to the highest standards for compatibility and reliability.

For those who need proven 386 performance to go, the COMPAQ PORTABLE 386 Personal Computer does things normally reserved for a desktop 386 PC.

For people considering 286 desktops, the COMPAQ DESKPRO 386s Personal Computer is an affordable way to move up to 386 performance. And if you have a 286 that you've outgrown, the COMPAQ DESKPRO 386/20e Personal Computer is an easy step up to the power and capabilities of a 20-MHz 386 machine.

For the increasing needs of today's 386 users, the COMPAQ DESKPRO 386/25 Personal Computer offers advanced performance. And for those who desire the most power and expandability available in a desktop PC, the COMPAQ DESKPRO 386/33 stands alone.

Whatever your needs in 386-based personal computing may be, Compaq has a machine that will meet them, a machine that's available *today*.

For a free brochure on COMPAQ 386-based personal computers and the location of your nearest Authorized COMPAQ Computer Dealer, call 1-800-231-0900, Operator 105. In Canada, 1-800-263-5868, Operator 105.

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COMPAQ

It simply works better.

PRODUCT REVIEWS

Lyte-Byte 3400 heavy on power

The Lyte-Byte 3400 portable computer from Micro Express features an Intel Corp. 80286 processor running at 16 MHz with zero-wait states.

The Lyte-Byte is a bit heavier and larger than most laptops, but it is a reasonable weight for a portable computer. Total weight of the machine, power cord and charger is 15.9 pounds. The Lyte-Byte measures 14.6 inches wide, 13.8 inches deep and 3.8 inches thick.

Thanks to its 16-MHz 286 chip, the Lyte-Byte 3400 is very fast. Hard-disk performance is similarly impressive. The system is very competitive with the various 386-based portables available.

Lyte-Byte 3400

Price: $2,995

- Performance: Excellent
- Documentation: Unacceptable
- Setup: Poor
- Ease of use: Satisfactory
- Serviceability: Good
- Support: Satisfactory to good
- Value: Very good

Standard features include 1M byte of random-access memory, expandable to 5M bytes; a 40M-byte hard disk; a 1.4M-byte 3-in. floppy drive; two serial ports; one parallel port; an external keyboard connector; an Intel 80287 coprocessor socket; and a port for connecting an external floppy drive. Also included are housing and cable for an external drive.

DOS is not included, though the hard disk arrives in bootable condition. One half-length 16-bit expansion slot is provided, though the slot is a bit too narrow for a card with a piggyback board or a modem card with a speaker.

The built-in gas plasma display supports IBM's Enhanced Graphics Adapter graphics, and the display controller can be connected to an external monitor. Unlike most competitive machines, the Lyte-Byte can drive both displays at once.

The manual that comes with the Lyte-Byte 3400 is still in draft form. It is difficult to understand and nearly impossible to use for reference. There is no packing list, no setup guide and no on-line Help facility. Files referenced in the manual do not actually exist on the disk provided.

The excellent speed of the Lyte-Byte 3400, very good display and good keyboard all add significantly to ease of use. Offsetting factors are the relatively heavy weight, large size and confusing documentation. Some aspects of keyboard layout, such as an Escape key located on the right, are a bit awkward, but layout is comfortable and logical overall. The 85-key keyboard includes a full numeric pad.

The Lyte-Byte 3400 has a rugged case, solid display hinge and strong handle. The layout of the circuit board is clean, with no patches evident. The keyboard does not fit quite flat.

Micro Express' *Lyte-Byte 3400*

Micro Express offers a 30-day unconditional money-back guarantee on the Lyte-Byte 3400. A one-year warranty covers parts and labor; the floppy disk drive is covered for only 90 days, however. Technical support is available from 10 a.m. to 6 p.m. Pacific time via a toll-free number that does not appear in the documentation. The technical support staff has a very good knowledge of MS-DOS and personal computers in general but little or no knowledge specific to the Lyte-Byte.

With power that is at today's leading edge and a base price of $2,995, the Lyte-Byte 3400 will excite both the budget-minded and the power-hungry — if, that is, they have the patience to work their way through documentation that harks to the earliest days of personal computing and are willing to haul a weight of more than 15 pounds.

Impress adds WYSIWYG display to Lotus' 1-2-3

Impress, from PC Publishing, Inc., is one of two add-in applications that bring what-you-see-is-what-you-get (WYSIWYG) display and high-quality output to Lotus Development Corp.'s 1-2-3, Release 2. Allways, licensed by Lotus from Funk Software and included with both 1-2-3, Release 2.01 and Release 2.2 is the other.

Impress Version 1.0

Price: $139.95

- Performance: Excellent
- Documentation: Satisfactory
- Ease of learning: Excellent
- Ease of use: Excellent
- Error handling: Satisfactory
- Support: Satisfactory
- Value: Excellent

Unlike Allways, Impress provides full access to all of 1-2-3's features while you are in the WYSIWYG display mode. Apart from this important consideration, the two products are remarkably similar.

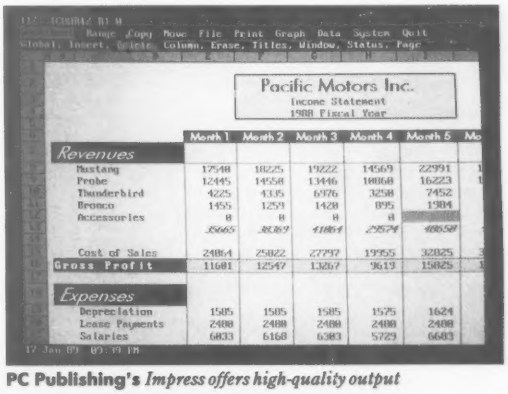
Impress works only with 1-2-3, Release 2.01 and 2.2. It uses 60K to 100K bytes of additional random-access memory and will use expanded memory if it is available.

Impress can be set up so that it is attached automatically, or it can be attached only when needed. Attaching Impress puts the system into graphics mode. It is possible to toggle between graphics mode and 1-2-3's normal text-mode display. Pressing the colon character or an Alt-key combination brings up the Impress menu system, which contains the formatting commands. The Impress formatting menu mimics the characteristic style of 1-2-3 menus.

Up to eight fonts and type sizes, line drawing, boxes and four levels of shading are available. Also, foreground and background colors can be varied by range. A particularly impressive feature allows viewing and printing of graphs along with text. Impress can work with "live" graphs, unlike Allways, which requires that graphs be saved in a .PIC file before they can be viewed or printed.

Impress works with all graphics printers and plotters supported by 1-2-3. It supports Adobe Systems, Inc.'s Postscript but must have the drivers provided in the Lotus Value Pack. It will use native printer fonts and cartridges and includes its own fonts, which can be downloaded. Also worth noting is a 12-point "symbol" font that includes a

Continued on page 42


Range Copy Move File Print Graph Data System Quit
Global Insert Delete Column Erase Titles Window Status Page
Pacific Motors Inc.
Income Statement
1988 Fiscal Year
Month 1 Month 2 Month 3 Month 4 Month 5
Revenues
Mustang 17548 18225 19222 14569 22991
Probe 12445 14558 13446 18068 16223
Thunderbird 4225 4135 6976 3258 7452
Bronco 1455 1259 1428 895 1984
Accessories 8 8 8 8
35665 38869 41864 29574 48658
Cost of Sales 24864 25822 27797 19955 32825
Gross Profit 11601 12547 13267 9619 15833
Expenses
Depreciation 1585 1585 1585 1575 1624
Lease Payments 2488 2488 2488 2488 2488
Salaries 6833 6168 6383 5729 6683

PC Publishing's *Impress offers high-quality output*

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Programming tool does Windows

Caseworks' Case:W builds templates, frameworks to ease process of application generation

Case:W 1.20A

Price: $795

- Performance: Very good
- Documentation: Satisfactory
- Ease of learning: Good
- Ease of use: Good
- Error handling: Satisfactory
- Support: Good to very good
- Value: Very good

Case:W Version 1.20A from Caseworks, Inc. is a programmer's tool used to assist in writing applications for Microsoft Corp.'s Windows. Case:W stands for Computer-Aided Software Engineering for Windows. To run, it requires an Intel Corp. 80286- or 80386-based computer, Windows, the Windows Software Development Kit from Microsoft and a Microsoft C compiler.

Case:W is not an application generator: It is more a template generator or a framework builder. It works by invoking user code when a specified menu item in an application is selected. That user code must then be written into the program framework generated by Case:W and is not written from within the product.

Itself a Windows program, Case:W allows the programmer to specify the menus, keyboard accelerators and dialogue boxes used in a Windows program. It then takes the information provided by the programmer and generates several files needed to create the program, including the .c, .h, .res and .def files. It also creates a Make file to be used with Microsoft's Make facility.

Anyone who has attempted to create a Windows program from scratch will be familiar with the difficulty in getting even a minimal program to run. Just getting the main window up with a title bar and menu bar is a major exercise. Case:W writes the code that does all the grunt work associated with processing messages and displaying menus and dialogue boxes. In the generated C source file, special comments show where application-specific details should be placed.

> ANYONE WHO HAS attempted to create a Windows program from scratch will be familiar with the difficulty in getting even a minimal program to run. Just getting the main window up with a title bar and menu bar is a major exercise.

Case:W also provides a way to get at other tools useful in the development of Windows applications, such as the Dialog editor, Icon editor, Font editor, a text editor, the Make facility and several other programmer-specified tools.

The product preserves the description of an application in an .app file. According to Caseworks, this .app file can be moved from Case:W to its Case:PM program without change to generate the same sort of files for OS/2's Presentation Manager applications programming interface.

Case:W allows modifications to the structure of a previously generated application by reading in the C source-code file and copying any application-specific code added by the programmer to the newly generated source-code file. This saves the programmer from having to re-enter any of this code.

During such operations as creating menu items, the tool's interactive performance is good, although there seem to be more screen repaints than necessary. File generation is quick; it took longer to compile the generated C source-code file than to generate it. The generated C source code is as good as many programmers could produce.

The documentation is relatively terse. There are only 80 or so single-sided pages in the manual. Although there is no index, the table of contents is detailed enough and short enough to help in finding information quickly. There is on-line Help for each menu item.

Included in the documentation is a Quick Tour, which assumes familiarity with using Windows and Windows programs. In 15 minutes, it takes the user through the process of creating a minimal Windows application. The result is a program that can actually be executed. Getting this far without Case:W has been known to take many hours, days and even weeks of poring over Microsoft documentation and sample source files.

Once learned, Case:W is easy to use. Inserting, deleting and changing menu items is as straightforward as every other normal part of using the product.

Case:W correctly warns users about using nonexistent dialogue boxes and other potentially erroneous conditions before generating a program. If the condition persists until generation, it points

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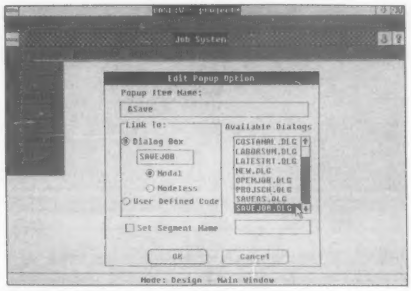
out the error and does not produce the new files. However, it is possible to leave the program with a modified application unsaved without getting a warning message.

Unlimited — but not toll-free — telephone support is provided to registered users and is also available via a bulletin board. Technical support is accurate and helpful. Caseworks offers a 30-day trial period.

For $795, anyone attempting to write a Windows program will find Case:W to be an invaluable investment. It could easily save at least a week of sheer frustration.



Case:W *eases Windows development*

Impress

CONTINUED FROM PAGE 41

variety of symbols that can be inserted into a worksheet.

Impress has a print preview feature that shows a full page at a time. Page breaks are always indicated, and forced horizontal or vertical page breaks can be inserted at any point.

Because Impress uses graphics display mode, scrolling is slower than 1-2-3's normal text mode. Toggling between Impress graphics mode and normal text mode speeds things up. Print speed is also slowed down in graphics mode.

A nice fringe benefit of Impress is its fully synchronized graphics feature, a feature built into 1-2-3, Release 3.0 but not available in Release 2.2 or 2.01. As many graphs as will fit on-screen can be displayed. Also, a .PIC file can be inserted for a static graph.

Impress produces high-quality output and has an assortment of formatting options. It can make full use of 1-2-3's macro capability.

When Impress is used with 1-2-3, Release 2.2, the colon key cannot be used to access Impress, since Release 2.2 accepts that character as a label. Also, the Impress on-line Help file cannot be accessed.

Impress comes with a complete and well-organized 116-page manual. The writing style is a bit ornamental at times. The on-line Help system is context-sensitive and includes a topic index. A reasonably experienced 1-2-3 user will be able to learn this product by experimentation. Installation is via a separate program and takes about five minutes.

Impress loses the WYSIWYG display when it runs without a graphics display, but the formatting attached to each cell is displayed on 1-2-3's status line. Saving a worksheet automatically saves the Impress settings in a separate format file. If a worksheet is edited without Impress attached, the format file's settings may no longer apply to the worksheet.

PC Publishing provides free phone support from 9:30 a.m. to 5 p.m. Pacific time. Technicians are adequate.

Impress lists for $139.95, which is $10 less than Allways. Impress, overall, is even better implemented than Allways.

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MICRO NOTES

IBM, Apple outfit space station

IBM and **Apple Computer, Inc.** said they will provide equipment for the information systems needs and design of the space station Freedom. IBM's proposal combines Personal System/2 Model 80s on a fiber-optic Token-Ring network with IBM's AIX, plus some communications utilities and various applications. The systems will be used to develop the space station's data management system. About 50 specially packaged PS/2 Model 80s will also be installed on the Freedom for use in space.

Computer Intelligence has acquired Dallas-based **Storeboard, Inc.**, which tracks sales information in the computer retail channel. Storeboard will become a subsidiary of CI, retain its own name, remain in Dallas and continue under current management.

Sun Microsystems, Inc. expanded the boundaries of its compact disc/read-only memory storage disk last week by introducing a model offering both audio and data capabilities. The 5¼-in. SunCD was designed for use with the Sparcstation 1 and reportedly packs 644M bytes of data or audio. The SunCD costs $1,500 and is scheduled to ship in 60 days.

Sun has also developed a new aid to spur development of Open Look graphical user interfaces under its Open Windows applications environment. Guide automates the task of building an application-specific screen, generating about 80% of the code needed to define a screen.

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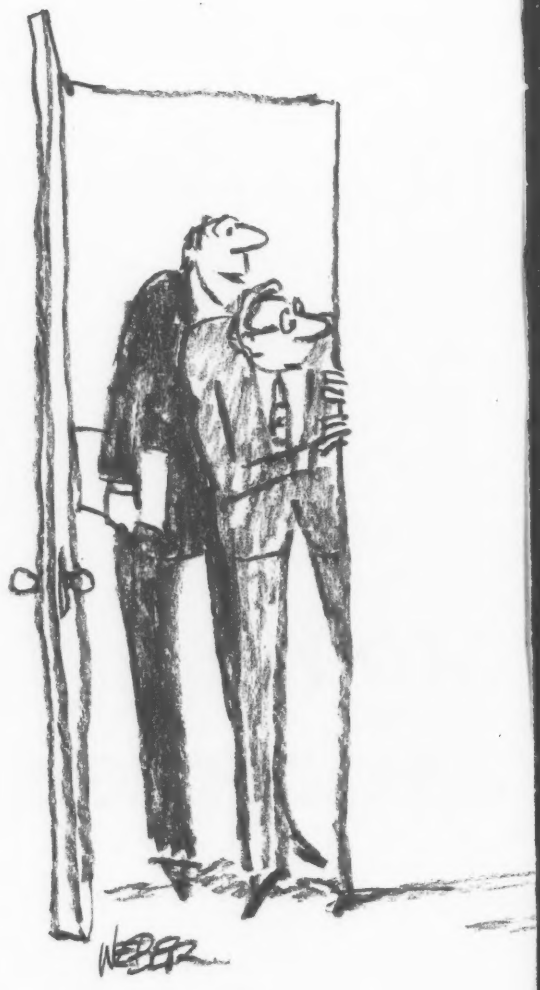

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Experts try to downplay virus danger

BY MICHAEL ALEXANDER
CW STAFF

A group of computer security experts is urging personal computer users to remain calm in the face of reports that several viruses are set to attack IBM and compatible PCs this week and beyond.

While computer viruses have become more prevalent, the number of malicious software attacks remains relatively small, according to the group, which includes the National Institute of Standards and Technology (NIST), the National Computer Security Center (NCSC) and the Software Engineering Institute.

There is no evidence that the viruses have spread more widely or are inherently more threatening than any other viruses, according to Dennis Steinauer, manager of the computer security management and evaluation group at NIST.

Two potentially serious viruses, one called the Datacrime or Columbus Day virus and the other dubbed the Friday the 13th virus, are reportedly primed to explode on Oct. 12 and 13, respectively.

The Datacrime virus, believed to occur in two versions, is said to attack every .COM file except the COMMAND.COM file typically found in the root directory of a hard disk drive. The Friday the 13th virus, of which there are several variations, is designed to corrupt files and disk file directory information on a hard disk drive.

Following routine and accepted computing practices can help reduce the likelihood of contracting a virus and can minimize its effects should one strike, the experts said. Their advice includes making frequent backups of data and using software obtained from reputable sources as well as cautious use of software obtained from bulletin boards or sent across PC networks.

Educating users about the different types of malicious software and how to guard against them is probably the best defense, Steinauer said. He recommended using antivirus software designed to identify and remove certain strains of viruses, although "no product can guarantee to identify all viruses."

NIST develops security standards for federal agencies and security guidelines for unclassified computer systems. NCSC, a branch of the National Security Agency, develops guidelines for protecting classified systems. The two agencies are heading up the formation of a nationwide network of computer security response and information centers.

The centers are being modeled after the Computer Emergency Response Team that was established last year by the Defense Advanced Research Projects Agency and headquartered at the Software Engineering Institute.

Pagemaker for OS/2 out

SEATTLE — Aldus Corp. announced recently that it had begun shipping Pagemaker 3.0 for Microsoft Corp.'s OS/2 1.1 operating system and the Presentation Manager graphical interface.

The firm expected to be among the first to ship an OS/2-compatible product for the desktop publishing market. Aldus is preparing another version, Pagemaker 3.01, for OS/2 1.2.

Under OS/2's windowed environment, users can access Pagemaker applications while viewing others.

For the new Pagemaker, Aldus recommends an IBM Personal System/2 or IBM-compatible machine based on the Intel 80386 chip, 4M- to 6M bytes of extended memory and a 40M-byte hard drive. It is priced at $795, but users of the MS-DOS version can obtain a $95 upgrade if ordered before February.

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Grid portable writes a new script

BY JAMES DALY
CW STAFF

FREMONT, Calif. — The puny portable continued to bulk up its once-scrawny computational muscles with Grid Systems Corp.'s recent introduction of a 4.5-lb. machine that can be held like a clipboard and recognizes printed handwriting.

The Gridpad is designed to streamline the chores of workers such as route delivery drivers and claims adjusters, who typically record data on paper forms. By entering data electronically and transmitting it to larger computers, the Gridpad eliminates the need to keypunch information from paper receipts.

Parent company Tandy Corp. also announced the Tandy 1100 FD, a notebook-sized 6.5-lb. portable that runs MS-DOS and contains 640K bytes of random-access memory. The machine can run for five hours on one charge of its replaceable battery and will be available next month for $999, Tandy officials said.

Grid hopes to carve out a new market niche with the Gridpad, much as Tandy did with its Radio Shack portable. "This is not a laptop; it's a new tool entirely," said marketing manager Kenneth Dulaney.

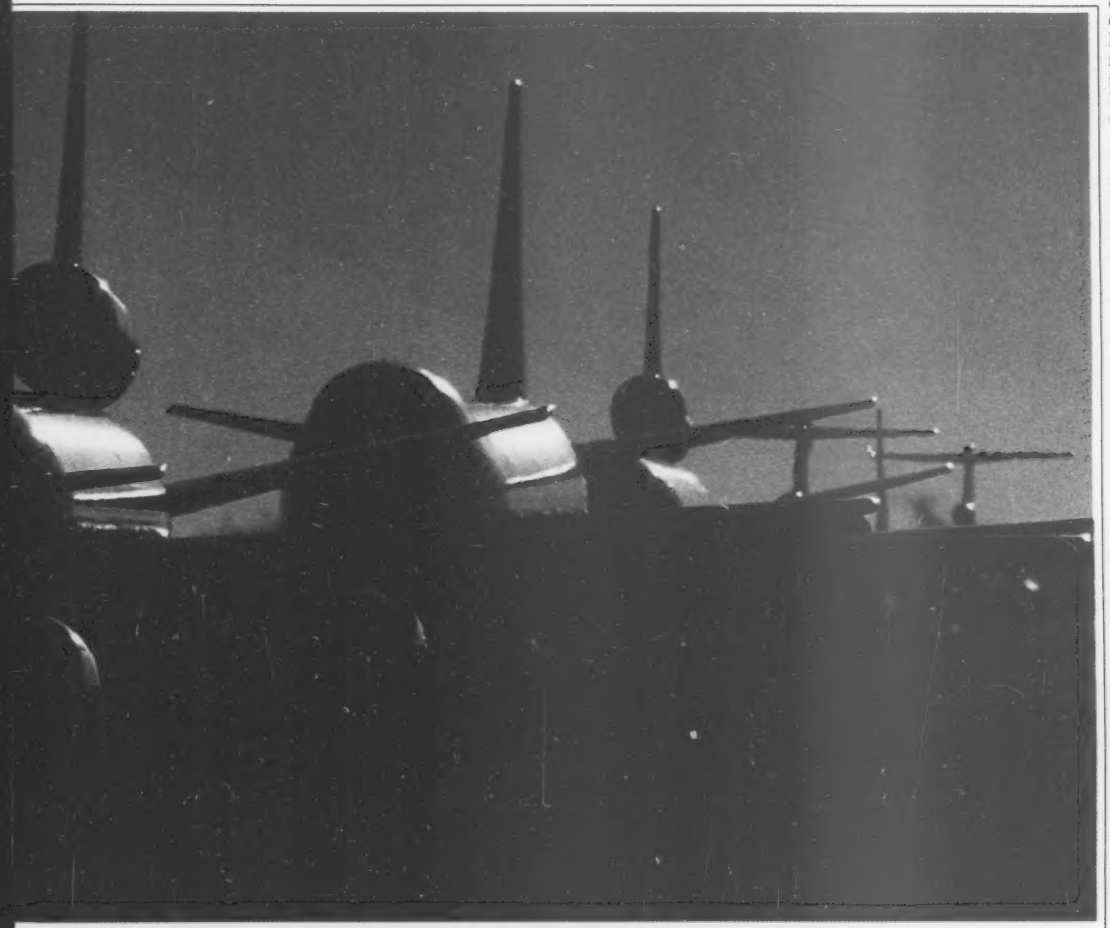
Analysts seemed impressed with the machine for its technology and capabilities. "In the rise of portables lies an opportunity for new companies to become important, not necessarily by displacing the leaders in desktop computing but by concentrating on the market and expanding on it," said Richard Shaffer, editor of the "Technologic Computer Letter."

To make the machine useful across a variety of needs, Grid essentially created a modified IBM-compatible computer. The machine measures only 9 by 12 inches and is 1.4 inches thick. Power is provided by Intel Corp.'s 10-MHz 80C86 chip.

Commands are entered by touching designated spots on the system's 10-in. liquid crystal display screen with an electronic pen that is tethered to the machine. After what Grid claims is about a one-second delay, numbers corresponding to the printed handwriting appear. If the number or letter displayed is incorrect, it can be crossed out and written again. Numbers can also be entered via a pop-up keyboard. Recognizing cursive handwriting remains beyond the capability of current computer science.

Gridpad's key technological advance revolves around its use of neural network principles to recognize handwriting. The machine's proprietary algorithm understands characters by looking at their shape and the order in which the character is drawn.

The system is designed to work for eight hours before the batteries need to be recharged. The Gridpad saves power by storing data and programs on credit card-size memory chip cartridges instead of disk drives.



se if it's always stuck in traffic?

trolled access features to protect and secure your important data.

And because NetWare SQL has been designed specifically for the NetWare operating system, it's the optimal database environment for your distributed applications. Plus you get the comprehensive support of Novell's other data management products with development tools like Btrieve® and XQL,® the multi-level application program interface to NetWare SQL.

Start reducing database traffic jams and increasing your network's performance.

Ask your local Novell Authorized Reseller about NetWare SQL, or simply call 1-800-REDWORD (733-9673).

NOVELL

For network solutions, you should be seeing red.

Committee sifts disks

The Microcomputer Managers Association's 486 Standardization Committee has asked several proponents of very-high density (VHD) formats for floppy disks to submit working prototypes of their drives and diskettes.

VHD formats aim to eke from 3M to 21M bytes of data storage out of an ordinary 3½-in. diskette, far more than the standard 1.44M-byte capacity now available.

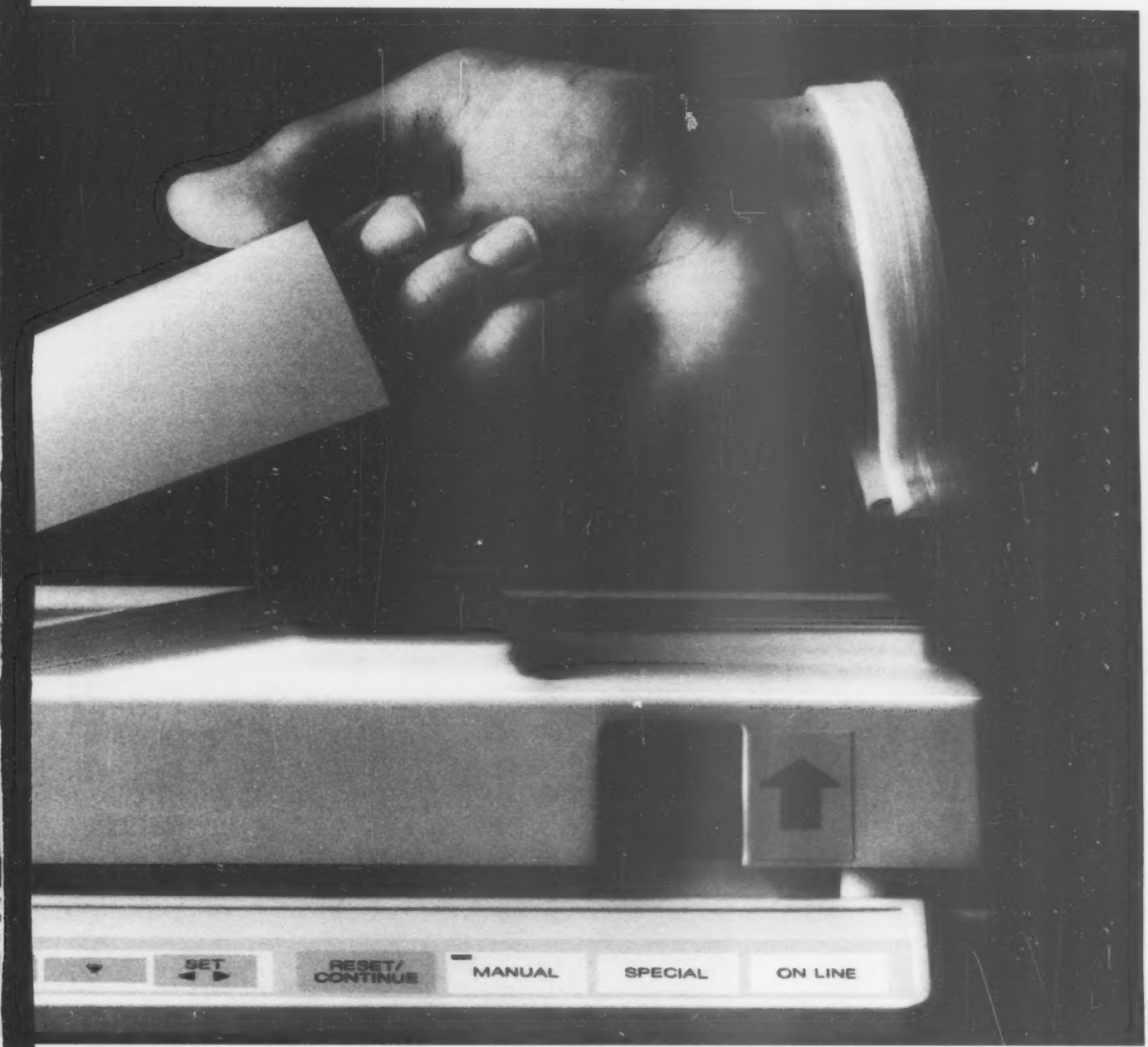
The 486 Standardization Committee hopes to encourage peripheral vendors to cooperate on developing a single industry standard. Five companies were asked to submit prototypes by Oct. 15 for testing by two independent laboratories.

The committee said that it plans to publish a report on its findings to help microcomputer managers in selecting products.

MICHAEL ALEXANDER

Epson EPL-6000. HP emulation. 300 x 300 DPI. 6 PPM. 512KB RAM, expandable to 4.5MB. 6 resident fonts. Two option font slots. Enhanced SelecType control panel. One year limited warranty.

UNTIL NOW, LASER PRINTING HAS BEEN OUT OF REACH FOR MANY PEOPLE IN BUSINESS.



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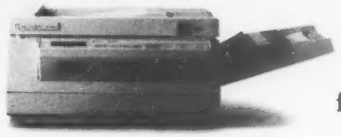


With the new, affordable EPL-6000 from Epson, more businesses will be looking better on paper.

Opting for the quality of a laser printer has just become decidedly easier. Introducing the EPL-6000 laser printer from Epson.

Coming from the company with the longest running success in the printer business, reliability is a given. What's more, the new EPL-6000 is compatible with application software written for the HP LaserJet II.

As for value, this new Epson combines solid, businesslike performance with a price that is as attractive as the printing. In fact, for quality, reliability and value in a laser printer, you could say Epson has the solution well in hand.

EPSON

WHEN YOU'VE GOT AN EPSON, YOU'VE GOT A LOT OF COMPANY.™

Disabled gain hope with high-tech device

BY MARYFRAN JOHNSON
CW STAFF

"Roger, alpha, charlie, henry. Enter. Keyboard. Escape."

Those words are the sound of horizons expanding.

And when Rich Walsh speaks them into his Heath/Zenith Prab Voice Command II vocational workstation, this man who is paralyzed from the neck down can move administrative mountains.

Walsh is president and director of the Resource Center for the Handicapped Institute of Technology in Seattle, one of the foremost rehabilitation training schools in the U.S.

For the past month, he has been exploring a newfound freedom that still amazes him. Using only his voice, Walsh directs his machine to take messages, build files, write letters, make phone calls, fiddle with spreadsheets, review grants, scrutinize accounts or generate monthly reports.

"This thing is mind-boggling. I'm like a kid now," said the 50-year-old father of four. "Here I've been pushing high-tech for the disabled, but I didn't really think it would work for me. I was a computer-illiterate."

Heath/Zenith Educational Systems began commercially marketing the $22,000 Voice Command II this past summer. Company officials hope the machine will proliferate in workplaces and offices, allowing severely disabled people to be productively employed.

The heart of the system is proprietary voice control hardware and software developed by Prab Command, Inc. of Kalamazoo, Mich.

The machine recognizes slang, dialect and words slurred or distorted by a speech impediment. The only catch is that the sound for each command must be made consistently each time.

"This technology has been like The Equalizer for the disabled," Walsh said. His workstation is connected to a Digital Equipment Corp. Microvax 3900, giving him total access to the machine running the business end of his school. "Someone like me can be a CEO. It's phenomenal," he said.

The top end

The full-blown version of the workstation is the Voice Command I, which costs $49,000 and comes equipped with a robotic arm. It is in use now at about 15 rehabilitation hospitals and training centers nationwide.

The Voice Command I is made up of a Zenith personal computer and monitor, voice-controlled keyboard, printer, telephone management system and robotic arm.

"Having the robotic arm to get manuals off the shelf is a real big thing for me," said Wayne Dinger, a systems specialist with Prab Command. The 30-year-old software "troubleshooter" helps Prab convert MS-DOS-based packages to voice control. He has been a quadriplegic since a 1977 diving accident.

At his apartment, Dinger uses the workstation — without the robotic arm — to help him live independently. An environmental control device managed by

Mac IICI

CONTINUED FROM PAGE 39

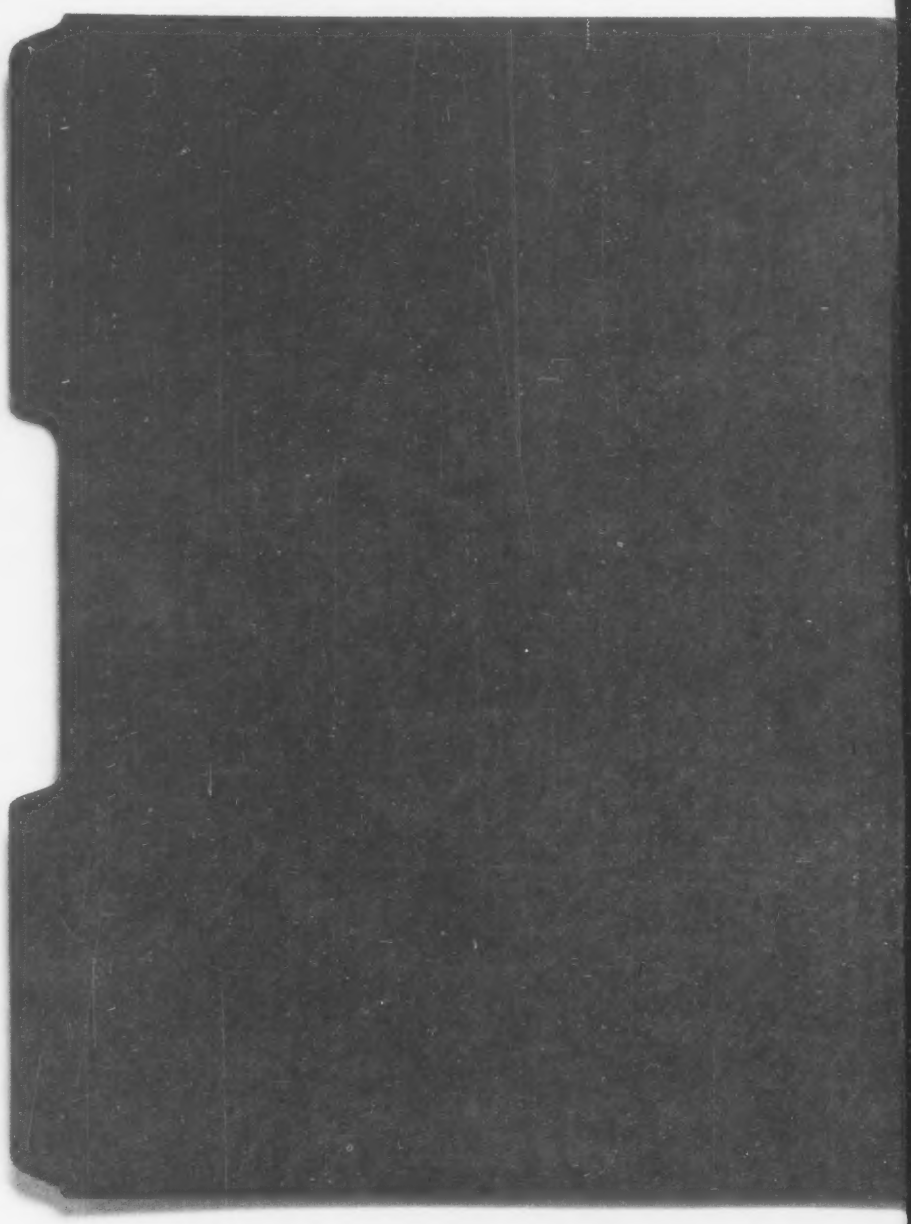
An enhanced Apple A/UX operating system, announced with the IICI, should also appeal to workstation users. "In fact, I wouldn't be surprised if this configuration — the IICI with the enhanced A/UX — was the one that helped them win their recent series of federal contracts," said Bennie Lorenzo, an analyst at Volpe, Covington & Welty in San Francisco. Apple has recently secured large deals with the U.S. Air Force and the U.S. Postal Service, among other federal agencies.

Although these features bump the IICI up against low-end HP and Sun workstations, some feel the IICI's lack of both a graphics coprocessor and on-board expansion capabilities make it fall short. "If I slap in a 24-bit graphics card and an accelerator, then I'd have a high-end CAD workstation that I could use, and I'd save $60,000," said Mike Bailey, a systems integrator at Lockheed Missiles and Space Corp. in Sunnyvale, Calif.

With low-end competition tightening, workstation makers have also begun looking at the high ground. As the Mac and other PCs begin to hit the 4- to 5-million instructions per second (MIPS) range, workstations will move toward the 10- to 20-MIPS range and put more heat on the traditional midrange.

In some sense, it is inevitable that economic forces will close the gap between Apple's high end and workstations. The Mac market continues to attract immense sums of research and development investment, favoring its rapid evolution.

Workstation makers have responded by trying to make their machines more user-friendly and hungrily eyeing opportunities beyond their traditional turf. Sun's 386I is one of the more notable attempts to integrate the power of the workstation with the friendliness of the PC. The machine boasts DOS compatibility, the Mac-like Open Look graphical interface and powerful Unix-based workstation capabilities.



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the computer turns on his lights, makes his coffee in the morning and charges up his wheelchair.

Both versions of the workstation come equipped with a telephone management system, which can place and receive phone calls as well as allow users to take notes, create phone indexes and access databases, libraries, bulletin boards and networks.

"I think it represents an important advancement," said Susan Brumell, director of the federally funded Clearinghouse on Computer Accommodation in Washington, D.C. "This is the first time that a successful robotics industry has looked to a new application arena — to rehabilitation, independent living and employment opportunities."

IBM upgrade

CONTINUED FROM PAGE 39

than 200 firms sampling the chip with active plans for it, Intel said.

Early users of IBM's 486/25 Power Platform add-in card include Continental Bank NA in Chicago, Allstate Insurance Co. in Northbrook, Ill., and the University of New Mexico School of Medicine in Albuquerque.

The Power Platform card enables users to swap out existing 25-MHz 80386 processor boards with a 25-MHz I486 processor. The 32-bit microprocessor also includes an internal cache memory controller, internal cache memory and an internal floating-point math coprocessor.

Both the bank and insurance carrier said they are using the 486 upgrade to enhance and speed up financial applications. The School of Medicine is applying the performance boost in a three-dimensional image-processing application used to analyze blood cells.

Benchmark testing of Continental's software, which analyzes values, yield curves and portfolio evaluation, reportedly showed a PS/2 Model 70-A21 equipped with the Power Platform running between 70% and 120% faster than a comparably equipped 386 system with a math coprocessor.

At Allstate, preliminary tests showed that the Power Platform enables the Model 70-A21 to run three times faster than the 386-based version.

Products amid the posturing

It was not all posturing at the recent IBM briefing on Micro Channel Architecture (MCA), which also served to ambush upcoming Extended Industry Standard Architecture (EISA)-related announcements. There was substance, too, in the form of memory upgrades and new Personal System/2 models.

Users seeking a closer inspection of the ins and outs of MCA technology have two options. The "Personal System/2 Hardware Interface Technical Reference" manual will be available by the end of the year. Also, a series of MCA seminars said to provide technical descriptions of the advanced MCA capabilities detailed by IBM two weeks ago [CW, Oct. 2] kicks off the first quarter.

Those advanced capabilities include much faster data transmission — up to an eightfold increase in speed — and automatic fault detection features said to allow users to isolate faulty processors and switch CPUs without disabling the entire system. Board makers got an assist via a standard method for communication and data exchange and pacts with Intel Corp. and Chips and Technologies, Inc. to co-develop bus master adapter chips.

"This is just the first shoe to drop in the EISA-MCA bus wars," said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. He dismissed most of the bus master cards available today as "impotent." IBM's announcement will help provide developers with a basic chassis on which to design, he said.

"This very much fits into the IBM mode of making directional announcements to try and buy time with customers," countered Mike Swavely, president of Compaq Computer Corp.'s North America operations, asking why after all this time, "there is still nothing new."

Actually, there are a few new things. While users wait for the fruits of IBM's largesse to drop from development trees, they may want to peruse the following items unveiled at IBM's briefing:

- Two new versions of the PS/2 Model 70 said to offer more affordable disk drives and a PS/2 Model 30 286 sporting a larger, faster fixed disk drive.
- Increased system memory on several PS/2s at no charge.
- Price cuts on selected PS/2 models, including a $200 rebate on the Model 55.
- Availability of IBM's PS/2 Standard Edition Version 1.2 with some previously unannounced functions.
- Availability of OS/2 Programming Tools and Information Version 1.2.
- Report Program Generator II Application Platform and Toolkit Version 1.1, said to allow customers to operate midrange applications on Micro Channel computers.

PATRICIA KEEFE

PC WEEK \ CONNECTIVITY \ NETWORKING

PAGE 38

FIRST LOOK

DCA's Convertible: Is It IRMA? Or Sybil?

By David Strom

Though officially dubbed the IRMA 3 Convertible, a more accurate moniker for the new multiple-personality board from Digital Communications Associates Inc. (DCA) would be Sybil. A few deft twists of the wrist, and the board adopts whatever persona or configuration is needed at that moment.

The wealth of choices—Micro Channel or AT bus, coaxial or twisted-pair cabling, IBM- or IRMA-style emulation—makes DCA's board an engineering marvel. At the same time, however, the Alpharetta, Ga., firm wisely borrowed some tips from its competitors. For example, it uses single application-specific chips à la Novell Inc.'s PCOX, a nifty configuration utility à la Attachmate Corp.'s board, and two items found on many products: a built-in balun for twisted-pair wiring and downloadable microcode that makes upgrading firmware less painful.

But one thing the Convertible has that all others lack is the ability to run on all current PCs—Micro Channel architecture (MCA), PC and AT alike. And switching from classic bus to MCA takes even the most fumble-fingered user just a few minutes: Simply remove the back-edge connector, flip a series of switches, invert the business end so that the coax Bayonet Nut Coupling connector is aligned with the rest of the card, and put everything back together.

We tried several 3270 software packages, including DCA's e78, e78 Plus and Crosstalk Mk.4, Relay Communications Inc.'s Relay Gold, Attachmate's Extra! and IBM's 3270 Emulation Program version 3.0. When the Convertible was configured as an IBM board supporting distributed-function terminals, the IBM, Attachmate and Relay emulation software worked flawlessly on both machines; this included the multiple-session support that Extra! provides.

TSO IND$FILE file transfer also worked well with the IBM and Attachmate products.

DCA's IRMA 3 Convertible Rides Either Bus

It's Simple To Switch from Standard Bus to MCA

1) Flip switches and jumpers. Switches change the board's personality from AT bus to MCA. Jumpers enable it to use either coax or twisted-pair cabling.

2) Invert the BNC connector. Since the board will be placed upside-down in the machine, the connector must be rotated so that it aligns with the rest of the card.

3) Attach blue plastic card guide. These align the board in the MCA machine.

4) Attach a metal back-edge connector. This holds the board in place in an MCA slot.

5) Configure software. Download microcode to the board to specify either IBM or IRMA personality.

DCA/IRMA 3 Convertible

Dale Dave you looked into Hdds yet? Tom

Customer Representative
Marketing Information Group

DCA

1000 Alderman Drive
Alpharetta, GA 30201-4199
1-800-241-4762, Ext. 54
In Georgia 404-442-4500, Ext. 54

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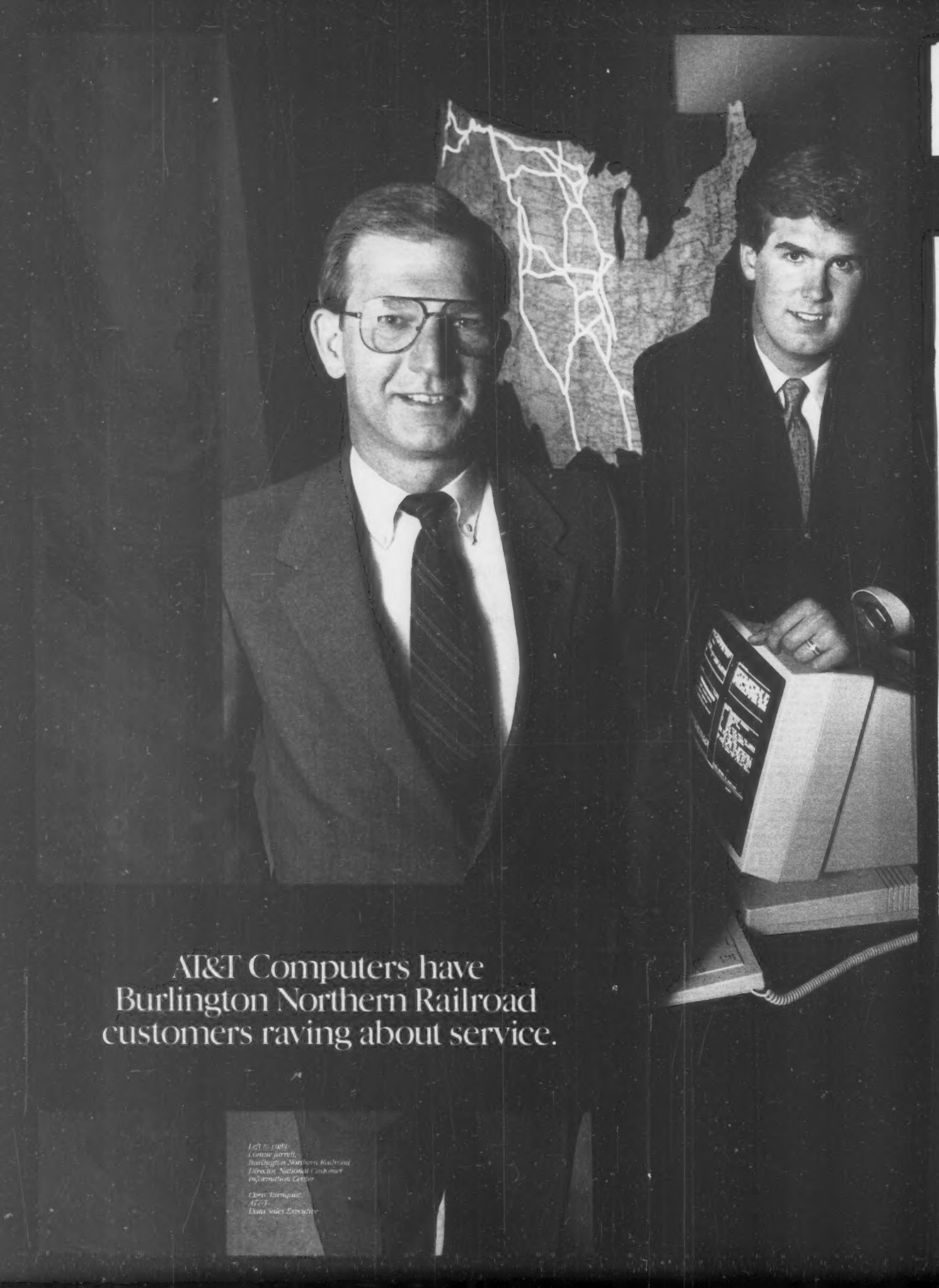

AT&T Computers have Burlington Northern Railroad customers raving about service.

Left to right:
Connie Jarrell,
Burlington Northern Railroad
Director, National Customer
Information Center

Chris Tarnapol,
AT&T
Data Sales Executive

Denver, Colorado
May 2, 1989

The Burlington Northern National TrackSmart® Center is getting rave reviews from its customers. And AT&T's distributed networked computer solution behind it is getting rave reviews from Burlington Northern. Burlington Northern's Lonnie Jarrell tells AT&T's Chris Turnquist why AT&T Computers provide a better way to serve customers of the longest railroad in the country.

Lonnie: We want to be known for superior customer service. So we planned proactive shipment monitoring through a new customer service concept—the National TrackSmart Center.

Chris: And better customer service means getting information to your customers, in *their* reporting format, as soon as your reps have it.

Lonnie: Exactly. All we had to do was listen to our customers to understand their transportation information needs. That was plenty of inspiration. We knew then that we needed a system that would let our reps instantly locate cars and report shipment status to customers immediately.

Chris: I remember when your reps could only handle one customer at a time. They had to query the mainframe database car by car. And *then* manually record their findings and send them out. Now each rep can handle up to ten customers, right?

Lonnie: Absolutely, plus the rep has more time to serve his customers better. Now they save time by tracking every car from *one* CRT. The AT&T 6500 Multifunction Communications System gives them multi-window access to two synchronous sessions on our host, as well as async access to the TrackSmart application and AT&T Mail. Both TrackSmart and AT&T Mail run concurrently on the AT&T 3B2/1000 Computer. So the reps get information the second they need it.

Chris: And you're able to tap information easily.

Lonnie: Right. Because you molded AT&T distributed networked computing to fit the Burlington Northern, rather than the other way around. You provide it all—computer networking systems and communications expertise. Plus you blend it all together with other systems better than any company I've ever seen.

Chris: I understand one customer wrote a BN rep promising him an official company ID naming him their Assistant Transportation Manager.

Lonnie: That's true. But you know, if we're going to be a partner to our customers, we have to be a partner with vendors who can take us in that direction.

The Burlington Northern Computer Solution

THE CHALLENGE

Differentiate Burlington Northern as a superior provider of customer service.

THE SOLUTION

A distributed networked computer solution integrating Burlington Northern's applications with a UNIX® System V-based Informix® 4GL database management package. An AT&T 3B2/1000 Computer is the gateway to the host for TrackSmart information. The AT&T 6500 Multifunction Communications System provides host access with four window functions appearing on AT&T 615 displays. AT&T Mail sets up an E-mail link between reps and customers. AT&T Mail with Private Message Exchange/TERM is a private E-mail link between Burlington Northern reps and TrackSmart.

THE RESULTS

The system increases the number of customers a representative services tenfold. Some customers have indicated TrackSmart saves them at least four hours daily.

Call your AT&T Account Executive, AT&T Authorized Value Added Reseller or 1 800 247-1212 Ext. 527.

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AT&T
Computer Systems

Alexander

FROM PAGE 39

as molasses in January.

IBM's executives said that the MCA enhancements would also make it possible for vendors to install any CPU, whether a Sun Microsystems Scalable Processing Architecture or a Motorola 68030, in a personal computer with an MCA bus. Think of the advantages this would bring IBM in the grand scheme of open systems.

IBM also announced that it had inked pacts with Intel as well as Chips and Technologies to co-develop bus master-compatible chip sets for MCA cards.

At a panel on EISA vs. MCA that I moderated in September, Gary Griffiths, manager of Personal System/2 systems development at IBM's Entry Systems Division, said there are more than 1,000 MCA cards available today and another 1,500 under development.

I haven't heard of any vendors knocking out EISA cards yet; obviously, most are waiting to see what will be under their own Christmas trees before putting any dollars into the research and development pot.

Also, IBM has asked National Software Testing Labs (NSTL) to test and certify MCA cards; the testing has already begun, and the initial results will be announced in November. NSTL also plans to test PS/2 clones next year. Both actions will help fuel the introduction of additional clones as well as MCA cards.

During the panel discussion that I mentioned, both camps challenged each other on the success of MCA as measured in percentage of machines shipped. EISA supporters said that IBM's PS/2 has met only moderate success and, in fact, appeared to be losing market share in recent months. The MCA supporters countered that any one of the Gang of Nine would be more than happy to have the dollars generated by the allegedly lackluster MCA. No argument about that: A couple of market research firms estimated that MCA machines account for between 13% and 14% of all PCs shipped worldwide. More important, MCA's momentum is carrying sales forward, they said.

ACTUALLY, the EISA camp may have accomplished all it had really set out to do. The Gang of Nine put pressure on IBM to loosen the tight licensing grip that it holds on MCA as well as reveal a bit more about what makes MCA tick.

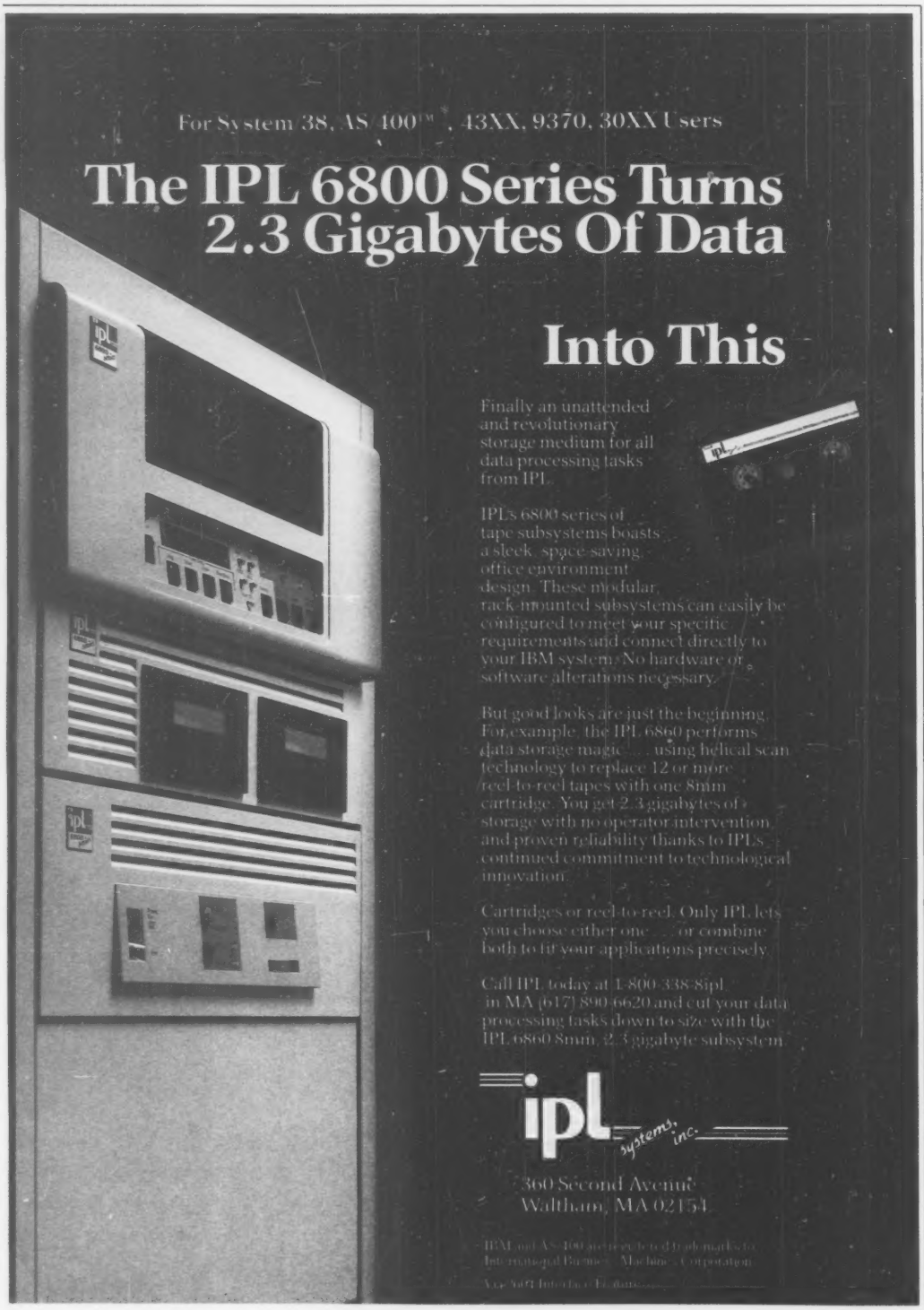
Don't worry — I am not going to overlook the fact that all of these enhancements are merely on paper so far. IBM says that it will be well into 1990 before any new products result from the new Streaming Data Transfer Protocols. So what? This "we got it on paper strategy" has been the mainstay of the EISA bunch for more than 20 months now. Look how well it has worked for them.

Actually, the EISA camp may have accomplished all it had really set out to do. The Gang of Nine put pressure on IBM to loosen the tight licensing grip that it holds on MCA as well as reveal a bit more about what makes MCA tick.

IBM says it will publish an updated MCA Technical Reference Manual in December that details how the Streaming Data Protocols operate to get rates of 160M byte/sec. It is doubtful that IBM would have been so forthcoming if nine companies were not laying in ambush.

Meanwhile, the Gang of Nine managed to eke out additional sales of their rapidly aging AT-bus machines by holding out the promise that faster and still-compatible machines were on their way. What's more, they did not have to pay the "cloner's fee" that IBM now demands.

Alexander is a *Computerworld* senior editor, PCs and workstations.


For System 38, AS/400™, 43XX, 9370, 30XX Users
The IPL 6800 Series Turns 2.3 Gigabytes Of Data
Into This
Finally an unattended and revolutionary storage medium for all data processing tasks from IPL.
IPL's 6800 series of tape subsystems boasts a sleek, space-saving office environment design. These modular, rack-mounted subsystems can easily be configured to meet your specific requirements and connect directly to your IBM system. No hardware or software alterations necessary.
But good looks are just the beginning. For example, the IPL 6860 performs data storage magic . . . using helical scan technology to replace 12 or more reel-to-reel tapes with one 8mm cartridge. You get 2.3 gigabytes of storage with no operator intervention and proven reliability thanks to IPL's continued commitment to technological innovation.
Cartridges or reel-to-reel. Only IPL lets you choose either one . . . or combine both to fit your applications precisely.
Call IPL today at 1-800-348-8ipl in MA (617) 890-6620 and cut your data processing tasks down to size with the IPL 6860 8mm, 2.3 gigabyte subsystem.
ipl systems, inc.
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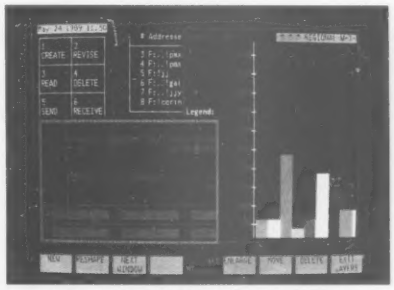
Waltham, MA 02154

The AT&T 3B2/1000 Computer. It's not just working on the railroad.

Whether you're into networking, office automation, software development, or anything in between, one thing is certain. You've just found the ultimate in distributed networked computing.

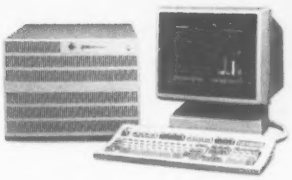
And Burlington Northern Railroad would agree. After all, they brought the AT&T 3B2/1000 Computer on board as the primary element of their National Tracksmart® Center. It was their ticket to better customer service.

First, it offered the best integrated systems solution. Second, was its value over time. You can actually add from 20 to 100 or more users, keeping your price-per-user cost relatively consistent. And it's field-upgradable. So you can move up to new models or enhance existing ones without major disruptions in the environment. It's this kind of buy-now-and-add-later strategy your business can grow with.



The AT&T 3B2/1000 and 615 CMT provide simultaneous interaction with multiple applications.

For instance, you can quickly and affordably go from 5 to 16 MIPS with multiple processing elements to more efficiently balance the system workload. And put distributed departmental computing a lot closer to your frontline users. What's more, you can add up to a full 15.9 GB of storage. As well as up to 64 MB of memory—perfect for massive database applications, file sharing and networking demands.



The AT&T 3B2/1000 Computer and AT&T 615 Color Multi-tasking Terminal.

And speaking of networking, the 3B2 gives you quite a long list of options. It can provide a bridge between open and closed computing platforms from a variety of vendors. Not only to help preserve your system investments, but strengthen them as well. Plus, it's great in wide-area connectivity environments. Or when you rely on heavy background processing like database management. Or *anytime* when accessing huge amounts of data or high availability is essential.

Now add the new Release 3.2.2 of UNIX® System V to the 3B2 and watch operating system performance soar. Together, they too protect investments. And they give you applications portability—just two more examples of the 3B2's price-performance superiority.

But keep in mind that it's not just the 3B2 that won over the country's longest railroad and its customers. It's the company behind it. So if you also can't afford to compromise on performance, price, compatibility or service, choose the AT&T 3B2/1000 Computer. And choose a whole dimension in departmental computing.

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AT&T
Computer Systems

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ust walk into a CompuAdd Superstore. You'll find the same low prices that you find in our catalogs. Low prices on systems, software, peripherals and consumables.

And you can touch the machines. Get the feel of the keyboard and compare monitors side-by-side before you buy. Shop peripherals and software. Check prices on consumables.

How can we offer catalog prices in a retail store? Simple. We cut out the middlemen. The stores are ours and the people who work there are CompuAdd people who know our products inside and out.

Remember, low prices don't mean less support and service. Every CompuAdd personal computer comes with a 30-day, no-questions-asked, money-back guarantee. Plus a toll-free technical and customer support line that's just a phone call away. We offer on-site service within over 260 Memorex Telex service areas, nationwide. And for CompuAdd models 220 and above, on-site sevice is free for one year. Call and you'll have a service representative in your office the next business day.

Or you can take your system to any CompuAdd Superstore. Every store is company-owned and has complete repair facilities.

It's all part of our customer driven way of doing business. Instead of corporate jets or fancy offices, our money goes into top talent, the best all-around support and service in the industry, and designing and building some of the most reliable, compatible and flexible machines you can buy.

So buy by mail, by phone or at a CompuAdd Superstore. Either way, you get the same low prices. And, either way, you'll find our emphasis on customer service a very pleasant surprise.

1-800-456-3660

CompuAdd 810

Proven XT technology working at 10MHz and now in a price range every home and business can afford. System, $595. As shown, with Color VGA monitor and 20MB hard drive, $1410. Call for monitor and hard drive options.

- NEC V20® processor running at 10MHz.
- 640KB RAM with parity checking.
- Built-in dual IDE hard drive interface.
- Built-in dual diskette drive controller.
- Built-in parallel printer port.
- Two built-in serial ports.
- Three full-size expansion slots.
- Two half-size expansion slots.
- Built-in game port interface.

CompuAdd 316s

You can open the door to 386SX software at an affordable price. It's a 386 running at 16MHz. System, $1495. As shown, with Color VGA monitor and 40MB hard drive, $2539. Call for monitor and hard drive options.

- 80386SX processor running at 16MHz.
- 1MB RAM expandable to 4MB on motherboard.
- 0 wait state page-mode memory.
- Built-in dual IDE hard drive interface.
- Built-in dual diskette drive controller.
- Built-in parallel port.
- Two built-in serial ports.
- Five expansion slots: three full-size 16-bit and two half-size 8-bit.
- Built-in game port interface.
- *One year's free on-site service.*

CompuAdd 325

Complete with 40MB hard drive, Monochrome VGA monitor, high speed cache memory, 101-key enhanced keyboard and one year of free on-site service, $3899. As shown, with Color VGA monitor, $4149.

- 80386 processor running at 25MHz.
- 0 wait state page-mode memory.
- 1MB fully available RAM expandable to 16MB.
- LIM 4.0 support.
- ROM shadowing into faster DRAM.
- 5.25" 1.2MB or 3.5" 1.44MB diskette drive.
- 16-bit VGA video adapter card.
- Three built-in ports (two serial, one parallel).
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NEW PRODUCTS

Systems

Packard Bell has launched a line of IBM Personal Computer AT-compatibles aimed at business, government and home office users.

Each of the four Intel Corp. 80286-based machines — the PB686, the PB800/16, the Legend I and the Legend V — is offered with a limited one-year warranty. The 12-MHz PB686 offers 640K bytes of random-access memory and sells for $1,495 as a base unit. The 16-MHz PB800/16 provides 1M byte of RAM and is priced from $2,249. Both are said to offer a variety of expansion capabilities.

The Legend I and Legend V computers, packaged as full turnkey systems, were developed for the first-time home buyer. They cost about $1,600.

Packard Bell
9425 Canoga Ave.
Chatsworth, Calif. 91311
818-773-4400

Micro 1, Inc. has announced the Power 386-33, a 33-MHz, Intel Corp. 80386-based personal computer with an intelligent 32-bit disk cache controller.

The product reportedly includes a 128K-byte random-access memory cache and operates at 7.5 million instructions per second. Standard configurations support DOS, OS/2 and Xenix systems; options include a hard-disk capacity of up to 5G bytes formatted and a 32-bit Ethernet card, the vendor said.

The manufacturer's suggested retail price is $9,995.

Micro 1
557 Howard St.
San Francisco, Calif. 94105
800-338-4061

Software utilities

Integrasoft Corp. has announced a hypertext software program that incorporates windowing interfaces for organizing and accessing personal computer-based data.

Called Inview, the package employs an intuitive notepad metaphor with embedded hypertext capabilities. This feature allows users to create hot links between text located on any page of the notepad with other pages, any other application program or file, the company said. A context-sensitive Help system is included.

Inview costs $99.95 and reportedly can run on IBM PCs, Personal System/2s and compatibles with DOS 3.0 or higher. Corporate site licensing is available.

Integrasoft
P.O. Box 7483
Princeton, N.J. 08543
215-968-9664

Discoversoft, Inc. has announced Treesaver, a memory-resident printing utility for MS-DOS computers that was developed to provide photo reduction capabilities for Hewlett-Packard Co. Laserjet printer users.

The software can print two or four pages on a single page and use as little as 18K bytes of random-access memory, according to the vendor. The package is priced at $89.95.

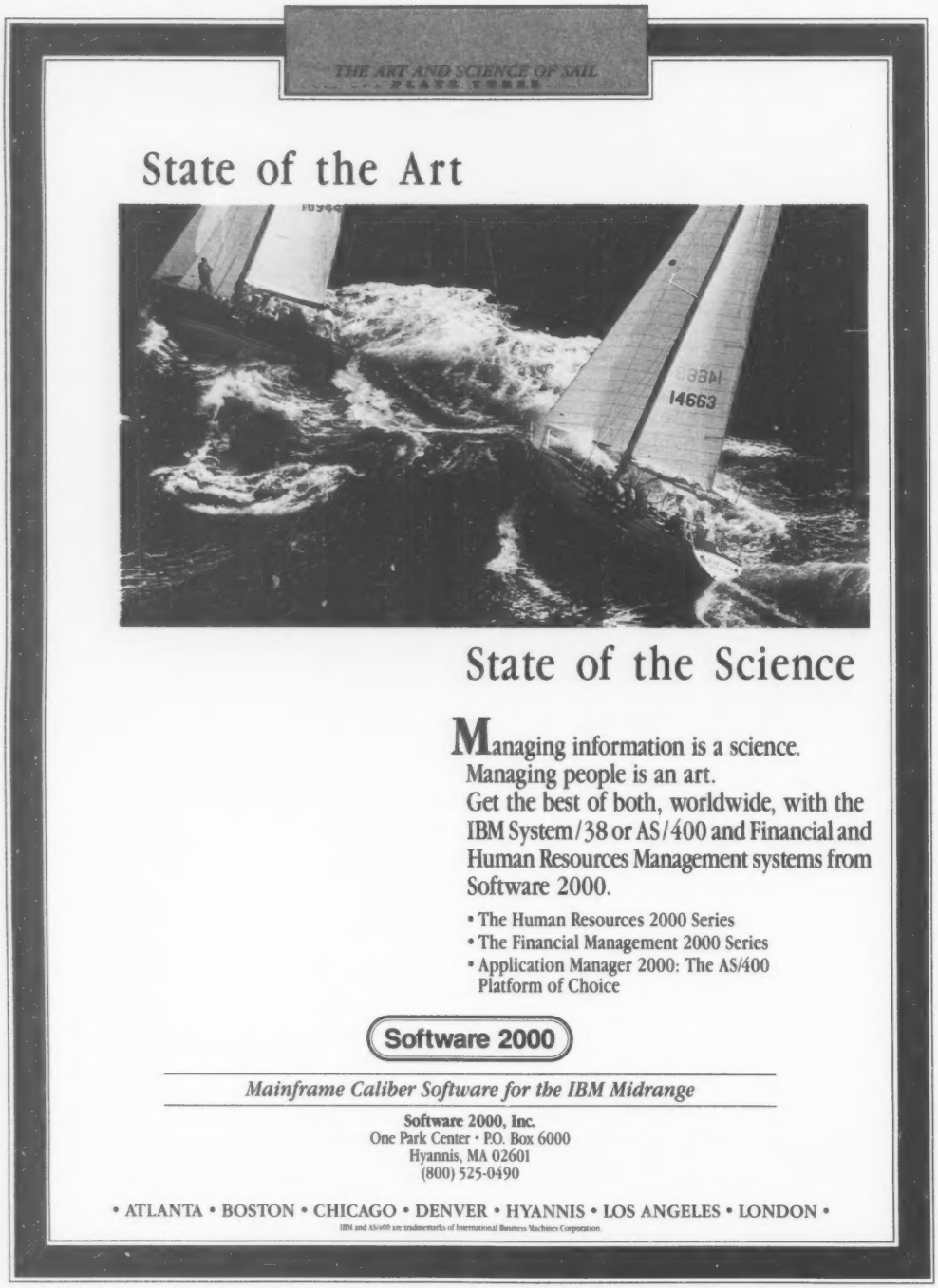
Discoversoft
1516 Oak St.
Alameda, Calif. 94501
415-769-2902

Development tools

Inference Corp. has announced Version 1.5 of its personal computer-based expert system tool, ART-IM/MS-DOS.

According to the company, the product was developed for distributed expert system applications in information systems environments and allows IS personnel to integrate knowledge bases and intelligent processing into traditional applications. The program is written in C, and application development reportedly requires 640K bytes of memory and 1M to 2M bytes of extended memory. Available in both 3½- or 5¼-in floppy diskettes, the product's first-copy price is $8,000 for development and $800 for runtime versions.

Inference
5300 W. Century Blvd.
Los Angeles, Calif. 90045
602-585-3066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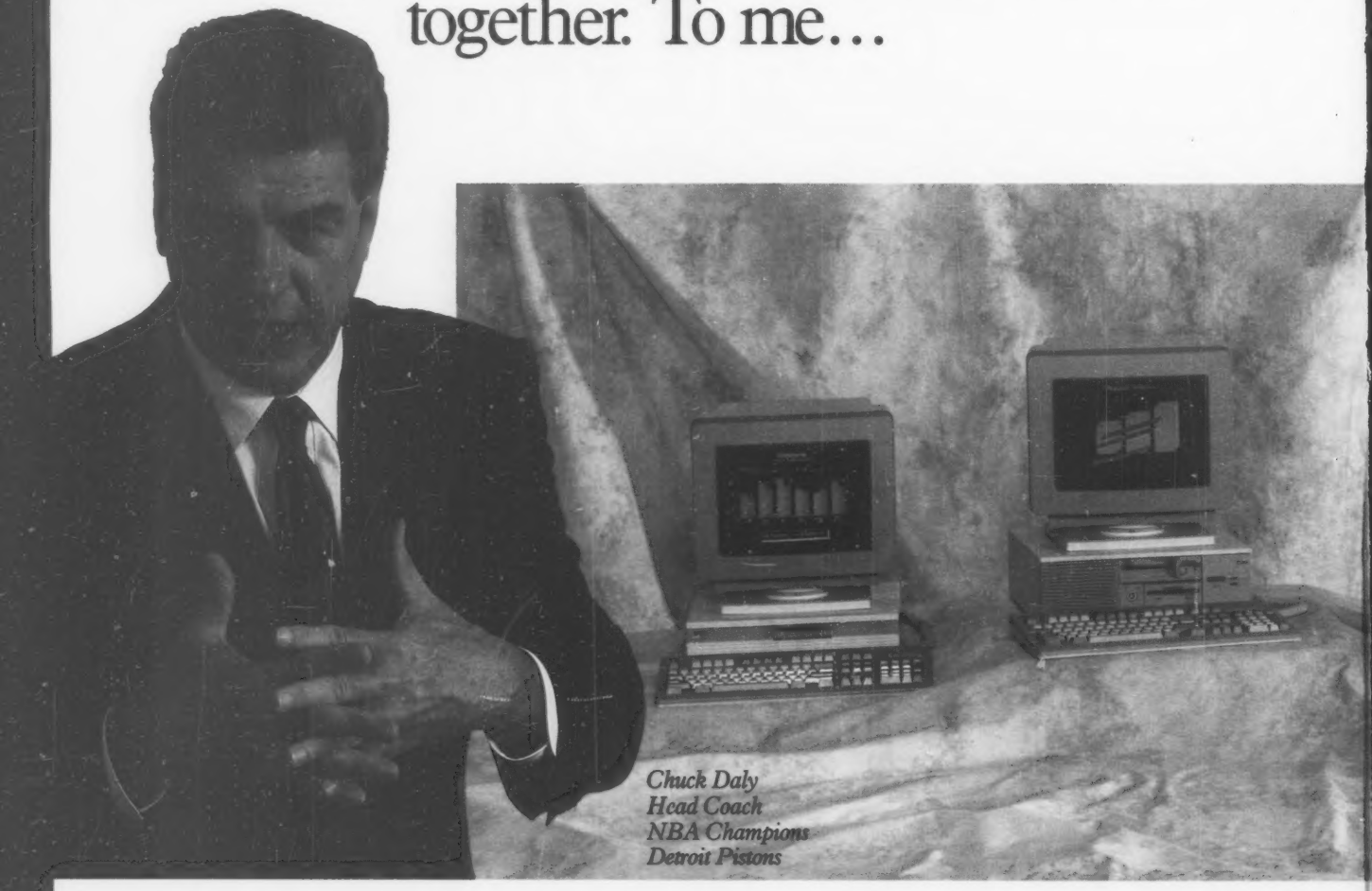

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teamwork is

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NCR's new series of personal computers is designed for teamwork. They share information, applications, and network resources quickly and efficiently. So people can make better decisions and work together more productively as a team. And that gives your company the jump on your competition.

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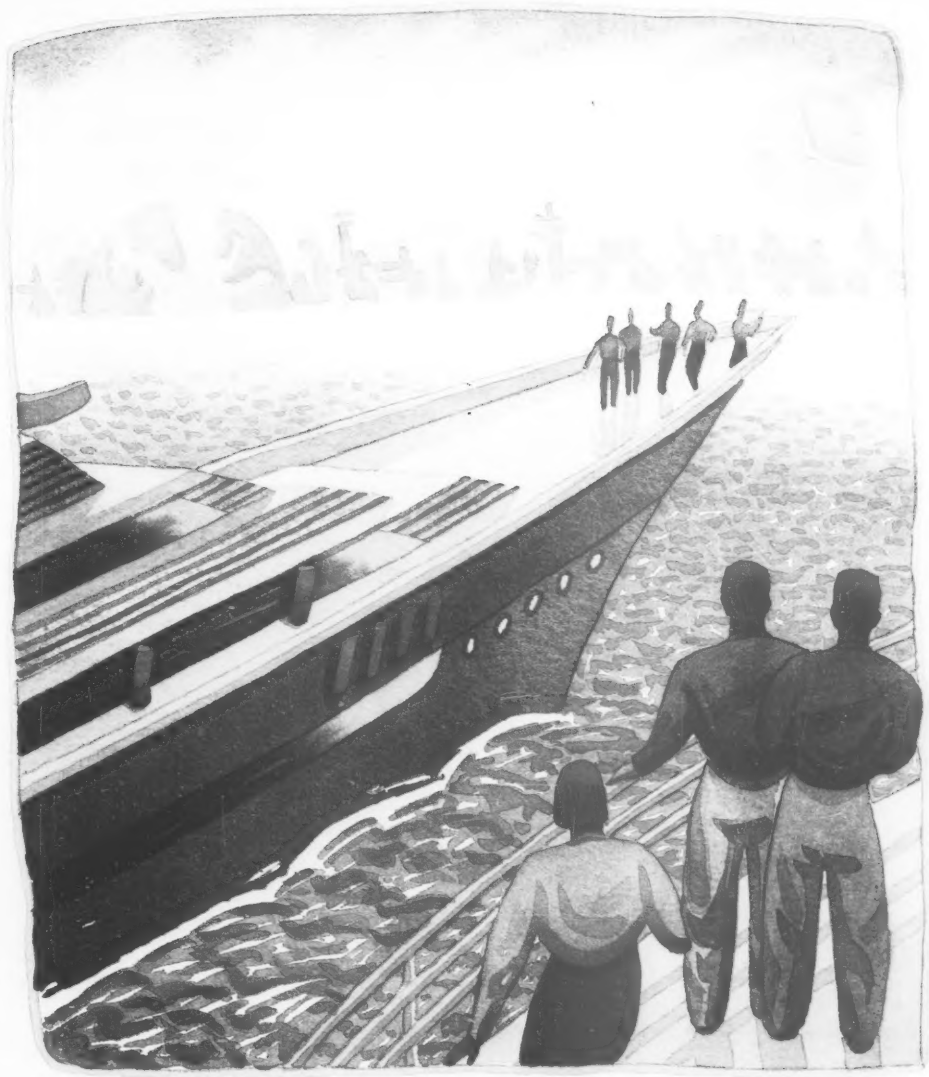
SPECIAL REPORT

IS IN THE 1990s

Beyond a storm of change lies a new world of business



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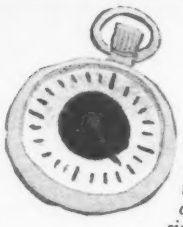

Technologies will *leap many barriers in the next few years. The challenge for IS professionals will be to keep up.* *Page SR/25.*

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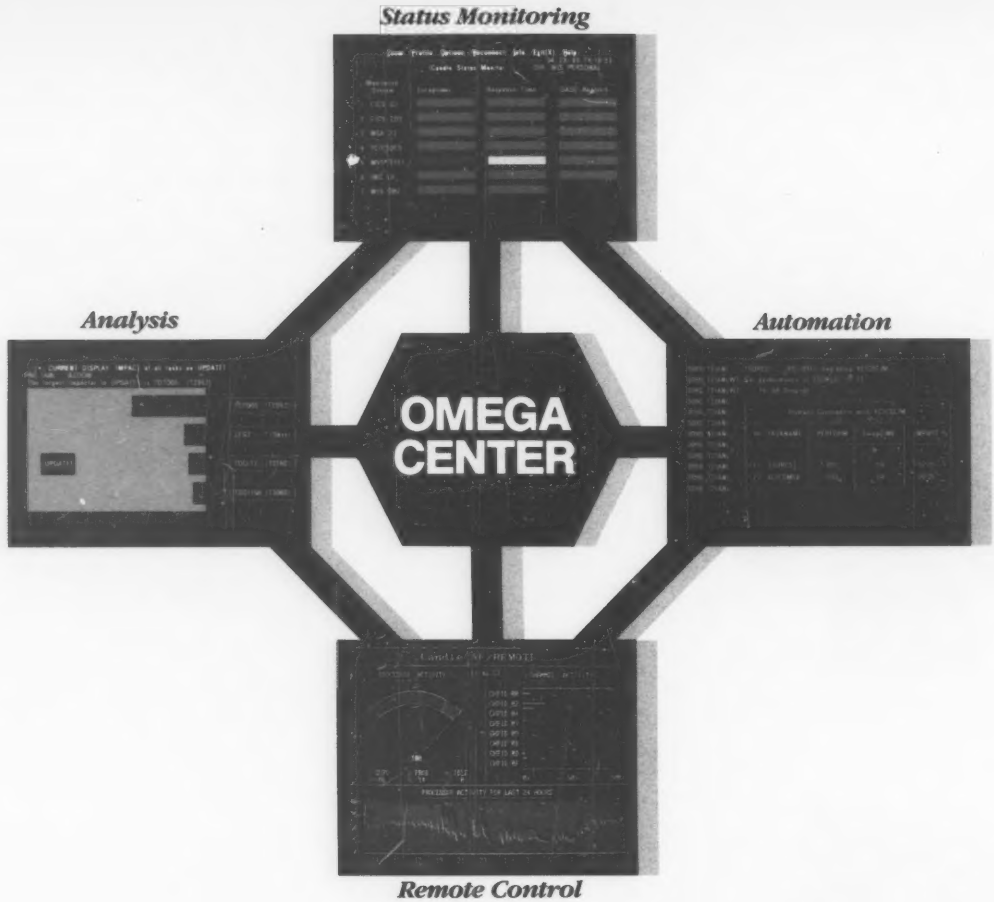

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Trade Winds

CHARTED ON a calendar, the year 2000 seems like a very short hop away. But the decade that lies between now and then will test the mettle of U.S. business. Many companies will have to jettison standard operating procedures to gain maneuverability.

For some, pushing forward against competition will require lashing together strategic collaborations with other companies. Ideas such as collaboration and global markets are new and will require practice.
Time won't be an ally, though. Product cycles, decision intervals and customer patience are all rapidly shrinking.

Rough weather predicted for the trip to the century mark

BY KATIE CRANE

Brace yourselves; it's going to be a bumpy decade. According to Michael Hammer, president of Hammer & Co., the squalls we've sailed through are only minor indicators of what is to come. In short, he says, "It's going to be murder to do business."

Actually, that's not just Hammer's opinion. Ask any roomful of trained observers of business and information systems and what you'll get is essentially the same alert message: Prepare for fast turns and tricky currents.

The consensus is that there will be more issues to juggle — and executives will have to juggle them faster than ever — but there will be fewer dollars to spend and fewer trained people to help. In all likelihood, creative and talented people will be urgently sought and extremely difficult to find. All firms, particularly those serving international markets, will have to be innovative and efficient at the same time. Everyone will have to look very hard at internal operations to compete, and tomorrow's global organization will have to think big but act small.

Crane is a free-lance writer based in White River Junction, Vt.

Experts agree that American businesses have taken the first step in the '80s by identifying the issues. The '90s will be the time to act, to take decisive steps toward rectifying the logjams and anachronisms we've isolated in the ways we do business.

There is agreement on another point, too: The critical business issues of the '90s are information-intensive. How, where and why companies invest in information technology is, in its own right, a business issue for the '90s. "Information technology has finally come of age," Hammer says. "At last, it is recognized as a critical ingredient."

Ask for a prediction about where business will be going in the next 10 years and then count the seconds before the word "global" dominates the conversation. That word is fast becoming the omnipresent adjective. We do not just have markets, competition and networks to consider anymore; instead, we must contemplate global markets, global competition and global networks.

As David Robinson, president of Cambridge, Mass.-based consulting firm Index Group, Inc., points out, we are already playing on a new field with very different rules for competition. One of those new rules, according to Robert de Roulet, executive vice-president of Cleveland Consulting Associates, is that it is not even enough anymore to react to global demands. If you want to win, you will have to create global markets.

Just playing a good, hard game will not take any trophies either, says Raymond Miles, professor and dean at the University of California at Berkeley's business school. If a company has been competing at what feels like high intensity, it will have to "turn up the competitive dial two or three notches from high to much, much higher," he says.

Trends to come

The global scope of business is not the news of the '90s, though. We may not have figured out how to deal with it yet, but we are all certainly aware of the trend. Some other realities may hit us even harder in the next few years because they have not yet penetrated our awareness as deeply. Some of the hottest of the hot buttons are likely to be service, product customization and manufacturability.

What all those words add up to, however, is a looming need for businesses to redefine and streamline their operations. There are, Robinson says, three major tasks involved in this process of "business re-engineering" — redesigning management processes, retooling systems and reorchestrating the way people think and operate. Robinson believes that the re-engineering of business will be the megatrend of the '90s.

This is a popular choice, in fact, although not everyone uses the label re-engineering. David McKay, director of research operations at Nolan, Norton & Co. in Lexington, Mass., says that restructuring of operations is the inevitable outcome once organizations have automated the back room and the external business interface. "Once you have both ends of the pipeline automated," he explains, "you're in a position to restructure basic business processes." He claims that virtually all of the traditional policies, procedures and business processes that have been built up during the past 30 years are now coming under fire. "Most are going to have to be thrown out and redesigned, and that will have a dramatic impact on the culture of the business."

Miles explains that tomorrow's organization will be looking for ways to be both flexible and efficient at the same time, which is why it will be so important to explore new structures and processes. "The organization of the future will be held together more by contract and market forces than by hierarchy," he says. Companies will perform only those functions for which they are best equipped and contract with others for the

rest. Although it may not come about in the next decade, what Miles sees as the logical outcome of this trend is a situation in which products and services will be designed, produced and delivered by a network of organizational pieces that may never be reassembled in exactly the same form again. McKay says he believes that the kinds of flexible interconnections among businesses that Miles envisions are generations off but that we are moving in that direction by bringing people together in multidisciplinary teams.

In fact, we are moving very quickly, says John Henderson, a professor at MIT's Sloan School of Management. The idea of teams is catching on, and during the next few years, teams of all shapes, sizes and kinds will dominate the business landscape. Eventually, he says, businesses will also explore other types of flexibility mechanisms; for the near term, however, teamwork will serve as a primary instrument of structural adjustment.

One important recalibration that will take a little longer, according to Henderson, is broadening the scope of job requirements. When a big organization tries to act small, which will be something that major organizations will have to try to do during the next decade, it must encourage every person to be a leader, he says.

Some impacts of the smaller-is-better philosophy have begun to be felt. But Miles and others expect that there is a lot more to come in terms of functional decoupling, downsizing and management shrinkage. Firms will be striving for leaner and sleeker profiles right through the decade.

Miles acknowledges that the demise of today's large-scale, multilevel structure will be painful for middle managers. He contends, however, that it will also be liberating. For those who remain, there is likely to be greater job satisfaction.

Although there may be too many people clustered in some spots, businesses are facing some serious labor shortages in other areas. Roy Amara, president of the Institute for the Future in Menlo Park, Calif., puts managing human resources near the top of his list of challenges for the '90s. It is not an item that has been high on anyone's list for several decades, he says, because the baby boomers gave business an employers' market. That easy ride will end in the next decade, however, because fewer people will be entering the work force and skill requirements are rising. Amara believes that the human element is "the big hidden factor" in increasing productivity.

Alan Magazine, president of the Washington D.C.-based Council on Competitiveness, seconds that point. Work-force issues, he says, are "the single most critical dimension of this country's long-term competitiveness — and our most troublesome area."

Both personnel shortages and the need to cut costs to improve profitability are likely to drive business toward even more aggressive use of information technology.

There will, many experts say, be a building boom in the information services sector during the '90s. And companies will not just build new systems; they will build them in new ways that will help to ensure continuous availability.

Most IS organizations will become experts at matching systems with business needs.

To react more easily to business changes, including mergers, acquisitions and leveraged buyouts (yes, they'll still be with us), companies will have to be able to "unplug" one system and "plug in" another. Information systems managers are on the right track, Robinson says, but they will have to push even harder, especially in terms of solidifying partnerships with business functions. As Henderson sees it, the key challenge will be to build and sustain internal, strategic alliances that mirror the external alliances that companies have been developing during the past few years.

Hammer warns, however, that while such alliances are critical, some may turn into painful entanglements during the course of the decade. The danger to which Hammer refers is implicit in the subtitle of a talk he often gives: "Is that an ax you're holding, Partner?" The point, Hammer says, is that re-engineering business practices does not always mean helping a functional manager do a better job. Sometimes, it means eliminating the job.

It may be that the only thing for an IS professional to do under such circumstances is to grit his teeth and remember that life has always gotten harder the closer you are to the top. Robinson is convinced that the IS function will achieve greater importance in the next few years, initiating large-scale projects and commanding more attention in executive circles.

Better status is not likely to bring bigger budgets, though. Robinson is virtually certain that IS organizations will continue to face intense cost pressures, which may lead to consolidations. A few organizations may continue to build "wish-driven" systems, but most will not be able to afford that luxury. Instead, he says most IS organizations will become experts at matching systems with business needs. All in all, McKay says, the passage to the year 2000 is bound to be turbulent for both business and IS. Those with the will and the vision to equip their companies with shock absorbers and stress-resistant systems will probably not only weather the trip but also enjoy it. It is those that cannot bend that are likely to founder. ●

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INTERVIEW

Are Americans tapping info systems' resources to their fullest potential?

The professor who headed up a three-year investigation into the weakness of U.S. industry sees work to be done

Professor Michael L. Dertouzos is director of MIT's Laboratory for Computer Science and chairman of the MIT Commission on Industrial Productivity, which produced the widely acclaimed report, *Made in America: Regaining the Productive Edge.* The report looked at eight major industries to find out what has really been going wrong in American business and what may be done to fix it. Dertouzos spoke recently with *Computerworld* Features Editor Joanne Kelleher about what he thinks information systems managers must do to help this country become more productive.

Would you say, based on your commission's research, that information systems are part of the current problem with American industry? Or are they a potential solution that hasn't been fully exploited?

I can't give you a firm answer because that isn't something we hit directly in our research. My own sense is that, right now, information systems are not being utilized to address the problem, although they could be.

What will IS executives need to do to achieve better utilization of computers over the next decade?

Specifically in our profession, I see two challenges for the '90s. The first one is the challenge of productive use of computers. The second one has to do with transforming the process of distribution — moving from a centralized delivery to a distributed delivery of information services.

How are we missing the boat right now, in terms of productive use of computers?

In doing this study, we found that while factory-worker productivity has been growing at about 13% per year for the last seven years, white-collar productivity has been dropping by at least 6% or 7% per year over the same period.

I'm not saying that computers aren't doing good things for us, even though the few studies that we have don't show any correlation between computers and any conventional measures of productivity. What I am saying is that computers now represent a major part of our economy, and we don't really know what they are doing for us in terms of productivity. If we make any attempt at all to measure such things, we do it subconsciously and intuitively.

Is it possible that the figures on the decline in productivity overstate the case because they aren't using the right measures?

It is possible. I don't think that those measures can be correlated to the computer at this stage. We don't have enough facts to say, "The reason that conventionally measured white-collar productivity is going down is because of the computer." The decline could be due to any number of things and I don't think it necessarily follows that it is due to the computer. But the thing that is a little frightening is that as we pioneered the development of this master technology we didn't seem to experience a corresponding increase in productivity that we could feel.

We need to know how computers are really being used and what it is that they improve. In fact, those are some of the sorts of questions I want to address in a major study of computer productivity that I am gearing up here at MIT.

Are there ways that you think we could be making better use of information systems?

Well, let me mention a few pitfalls that we've fallen into. The first computer fault, as I call these, is the additive fault. We add computer work to whatever we used to do before the computer. Think of a waitress who, in addition to taking your order like she always did, now has to punch everything that she wrote down into a computer. Clearly she is working harder, but is anything else happening better? Is the kitchen getting the order faster or is the inventory of food being handled better? Maybe and maybe not.

The second fault is the one that I really get angry about. It is what I call the excessive learning fault. I get a great new machine or piece of software and after five or six months, I truly can do things much faster and with more power, but this has cost me reading, learning and understanding a 400-page manual. Now if it takes 400 pages for me to learn one basic thing, how many more inches of paper do I have to learn to truly start using computers the way I think they should be used? I think there is something wrong here. We are trading power of use for weakness of learning.

The third fault is the overperfection fault. We sit in front of our wonderful presentation graphics programs and word processing programs and keep noodling to try to make the slide or the memo perfect. We could do what we have to do in five minutes, but the opportunity to make them more perfect is there, so we feel like we have to keep trying.

DAVID LEIFER

So what do we do to avoid these pitfalls?

We have to start looking at how we use machines to focus on using them well and focus on designing them and the systems and the software so we can use them well.

Some of that has to start with the manufacturers of the products.

A lot of it falls on the manufacturers of the machines and the software. But one hell of a lot falls on the people who manage the information service groups. I know that they are under great pressure from every side and don't have enough resources. But all I'm saying is, let's pause and ask, "Are we definitely doing something that is going to increase whatever the company is doing, make it better? And are we doing it in the simplest possible way, without falling into these pitfalls?"

Besides increasing productivity, you have said that IS faces the challenge of providing distributed delivery of information services. What do you mean by that?

At the simplest level, I'm talking about going from the clusters of big machines today to much larger groups of people using smaller machines — workstations and PCs connected in networks to these machines.

Now, people try to tell me that this has been done, but I say it hasn't been done.

There are lots of networks and products and there is a lot of activity. But these networks are being used at the most primitive of levels. They are just transferring text files back and forth. In other words, what you really have is a glorified telex system, although it costs a hell of a lot more than a telephone or a telex. What we really need to do is to have one machine understand what the other machine wants and to have them pull together to increase the effectiveness of the corporation, or their respective corporations.

You said that was the simplest level. What's beyond that?

I have a vision of a national information network, which could really help this nation go a long way toward being a major player and competitor in the world. This system would be as ubiquitous and as powerful as the telephone system and as easy to use. You could just plug your computer in and a lot of things would be understood. It could easily communicate, place orders or send mail. It could easily do a lot of things that today, we do standing on our heads.

Can you give us an example?

Start by thinking about bulk mail— $40 billion worth of business mail— that could suddenly be delivered in seconds, instead of five or six days. What would that do to the national productivity? Then, think about about the possibility of integrating purchase and sale of products and services through this medium. Then, of course, there are all kinds of new services that might be developed for this medium.

That's a long way beyond where we are now, though.

True. The immediate challenges for IS managers is better inter- and intra-corporate utilization of computers and development of distributed systems. We are moving into an era where a very large number of the employees of a company are going to be looking at information windows. We are enlarging the team of people who are going to use information from a few elite DP people to a much larger group of employees.

Will better distribution also help us to shorten some of the cycles in manufacturing?

It could help us shorten the cycles tremendously. Why are these cycles in manufacturing long? A lack of cooperation. The design department designs something and ships it over to manufacturing, where they build the prototypes. If it doesn't work, they write a memo. That goes up the ladder, then down the ladder to the designers. You get a lot of acrimony and formal memos flying back and forth and a lot of time wasted. Just imagine what an effective computer infrastructure — tying marketing, manufacturing and engineering into teams — could do to improve the process. •

The race to reclaim prosperity

BY JOHN DESSAUER

Fifty years ago, the world was headed for the madness called World War II. As 1989 draws to a close, the major players in world economics appear committed to peace and a sincere effort to improve standards of living. Technology is expected to enjoy explosive growth in the 1990s.

For the U.S., the race toward prosperity will not be easy. The international business environment will be more intense and competitive in the 1990s. Profits will go to firms that are tough international competitors. Even then, they will need the support of their government.

Twenty-five or more years ago, the U.S. was the leading automobile maker, inventor of the television set and provider of hundreds of goods and appliances that were the envy of the world.

Lately, however, the U.S. has been tarnished by an unwanted reputation for goods of a lesser quality, depressed by a loss of economic dominance and preoccupied with fears and anxieties about its future in a world of growing competitiveness.

Unfortunately, our national record in the 1980s is no source of comfort. After-tax corporate profits are a basic business building block. Without adequate profits, research suffers, development slows, capital investment becomes inadequate and general competitiveness slowly slips away. In 1980, total after-tax U.S. corporate profits stood at a respectable $152.3 billion.

In the nine years from 1971 to 1980, after-tax corporate profits grew 211%. The next nine years, however, were a different story. From 1980 to 1982, after-tax profits plunged.

The climb back was painfully slow. Finally in 1988, after-tax profits of $168.9 billion exceeded the 1980 level. While this recovery was welcome, persistent inflation reduced the profits' value to considerably less than that of 1980.

The story of profits, quality and competitiveness was a little different in other parts of the world. The Japanese enjoyed the best time in the history of that nation.

During the past two decades, Japan replaced West Germany as the top camera producer, took dominance in the watch industry away from the Swiss, became the leading auto producer and nearly destroyed the U.S. semiconductor industry.

Future opportunities

The 1990s are likely to bring significant new opportunities. For U.S. business to be competitive and for our nation to earn its share of the world market, we need to keep inflation down, invest heavily in new technology and new factories, keep military spending under control, significantly improve our educational system and, most of all, make sure that the dollar stays at a level that at least provides fairness in the pricing of our goods and services.

If the U.S. makes all the sacrifices required to accomplish these goals and fails to keep the dollar down, it will all be for naught. A nation struggling with the burden of a trade deficit, past mistakes and a less-than-glowing reputation for quality must face market reality.

The first step in reclaiming lost competitiveness is to offer quality goods at a price lower than the competition's. In world market terms, that means keeping the dollar's exchange rate down.

There is no shortage of entrepreneurs, intelligence or technological ability in the U.S. With the right cost of production — and a little help from the government — U.S. business will likely emerge as a tough, successful competitor in the 1990s. •

Dessauer is a principal at Dessauer Asset Management and publisher of the investment advisory letter, "Dessauer's Journal of Financial Markets."

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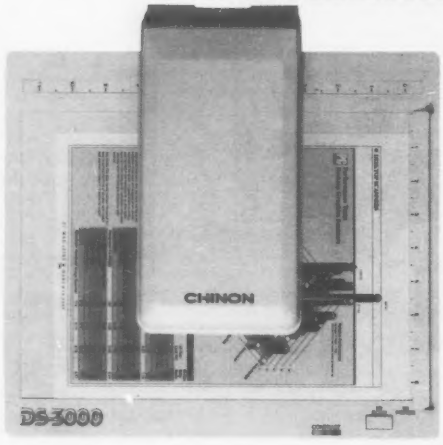

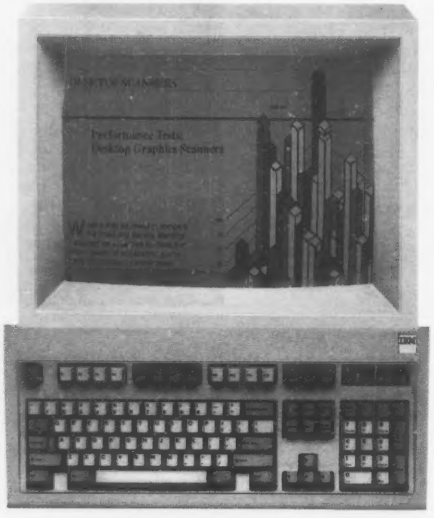

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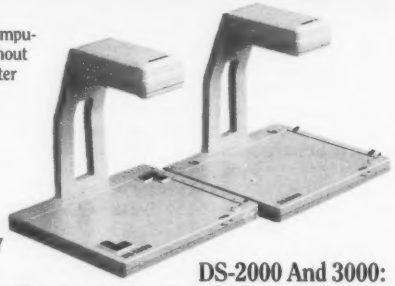

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INTERVIEW

Advantageous alliances

Where companies join forces to gain strategic advantage, information logistics become crucial

Kathryn Rudie Harrigan is a professor of strategic management and director of the Strategy Research Center at Columbia University's Graduate School of Business. She is the author of *Strategies for Joint Ventures* and *Managing for Joint Venture Success*, published by Lexington Books. Harrigan was interviewed by *Computerworld* Associate Editor Laura O'Connell.

Why are firms so interested in forming strategic alliances?

Firms engage in these alliances because they cannot do a lot of the things they need to do to remain competitive by themselves. Nobody has enough money to afford all the projects they need to be involved in to maintain their competitive edge. Things are changing too fast.

When you add a multinational dimension to this situation, you have to conclude that unless you get some help, unless you have some pretty good friends, you aren't even going to be able to stay abreast of the pack. So a lot of firms are getting into strategic alliances across national borders just for the sake of survival.

This is even happening among companies you would expect to be either vicious competitors or in very adversarial buyer/supplier kinds of relationships. Also, what these companies are concluding is that it would be better to be on a winning team of firms and share the profits than to be a lonely losing individual.

Why are these alliances so much more prevalent today than in the past? Is it strictly the cost?

It's the costliness, the riskiness and the complexity of what has to be done. In order to create a really attractive product offering, you're going to have to get the insights of a lot of different kinds of firms.

What are the most typical shapes that business alliances take?

Usually, what you see is the Japanese model, which has one big firm in the center and lots of little firms in a satellite configuration around that big firm. The big firm oftentimes has the little firms locked up in special little alliances, each of them doing an individual piece of the puzzle.

But I think the most important trend that we see now is toward another kind of a relationship, where each partner offers something that is complementary to the other. In a business climate where speed in getting to market is key, such a team approach can offer major advantages.

Can you estimate the average duration of such alliances?

Based on my database of 895 alliances of various forms, I found

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that on average an alliance lasts 3½ years. Let me explain the numbers behind that. There are a great number of alliances that are announced and then blow up quickly. At the other extreme, there are some alliances in my database that have lasted 10 or 20 or 40 years — one of them lasted 48 years. Given the nature of competition, I believe that more of the recently formed alliances will, by necessity, be short-lived. They are a transitory way of doing things.

Do you expect, then, that alliances will become a norm in business during the next few years?

There will be a lot more venturing than there was in the past.

Do you have hard numbers that indicate exactly how big a trend this is?

The growth rate in the formation of such ventures during the past two years was over 20% compounded annually. And it'll probably get even higher. There was a time in the early '80s when it was growing at a rate of about 7% compounded, but it's been going up geometrically.

How will this trend affect IS managers?

These people will have a critical role in these kinds of relationships because the key to making them work well is good communications. That means the information has to be flowing in real time. That requires good logistics. And your information officers are your chief logistical officers. They're the ones that see to it that the information gets to where it's supposed to be at the right time.

Should IS personnel take part in the planning stages?

They've got to negotiate. They've got to be part of the discussion when you put these relationships together. They've got to understand what the purpose of the relationship is so that they can find a way to make sure the systems give the people involved the capability to do what the venture is intended to do.

Is there anything else IS managers can do?

They're going to have to be very aware of the special problems associated with using these alliances. And they're going to have to work as watchdogs to make sure that when these systems get put together for these alliances, they work right. •

The difficulties of going global

BY TONY BREWER

Being a global company means mastering the challenge of worldwide information systems operations and support.

One international bank has been learning this lesson in the past two years. Headquartered in New York, the bank operated for years with branches in major cities throughout the world.

What happened, however, was that customers began to get smart. They realized, for example, that they did not need to buy or sell dollars at only their local branch. They discovered there were small differences in exchange rates around the world, so they started looking for the best rates and even began exploiting the differences to make a profit at the bank's expense. Their global approach forced the bank to think globally.

To appreciate the difference between the old international approach and the new global approach, look at the way firms such as Ford Motor Co., IBM, Matsushita Electric Industrial Co. and Procter & Gamble Co. now operate. These companies design and develop their products wherever the required skills are most plentiful. They buy raw materials and components wherever they are cheapest. They assemble finished products wherever they can achieve maximum economies of scale. And they sell everywhere.

There are three keys to succeeding in the global market:

- Recognize and exploit geographic differences.
- Achieve economies of scale.
- Attain economies of scope through global synergy.

Information technology can be harnessed to support all of these activities, but it requires a significant adaptive effort on the part of the information systems organization.

Tough transition

Developing global applications and managing the transition from the existing to the new applications portfolio may be very difficult.

A further complication is the need for quality data — data that has the same meanings, definitions and formats in different parts of the world.

There are also problems to overcome in implementing and supporting global applications. National, cultural and language differences make it extremely difficult to design the human work systems with which the computer systems interface.

In general, three management tasks are more important in a global company than in an international one: configuration, coordination and linkage.

Configuration is determining who does what and where. IBM's decisions about where to build printers and storage devices, and Ford's decisions on where to build engines and assemble finished vehicles are configuring decisions.

Coordinating involves establishing flows within functions as well as transferring skills, information and experience to maximize functional effectiveness. Digital Equipment Corp. designs microchips in Israel, and Bechtel Group, Inc. supports engineering projects in Ireland because they have electronic mail and computer conferencing systems that permit communications and group work across large distances.

Linkage entails establishing flows between functions and among the firm and its suppliers and customers. Systems that enable products and production facilities to be developed in parallel, feed back customer service information to marketing or tie in suppliers and customers and encourage repeat business are all linking systems.

In the words of the systems director of the international bank mentioned earlier, "Getting business mangers to recognize the need to change from an international to a global orientation was difficult. Getting the business and systems managers to agree on what needed to be done was very difficult. But developing a new global system was virtually impossible." It has taken a cool reappraisal and restructuring effort for the bank to overcome these problems. •

Brewer is director of the Butler Cox U.K. Foundation, a syndicated research organization based in London.

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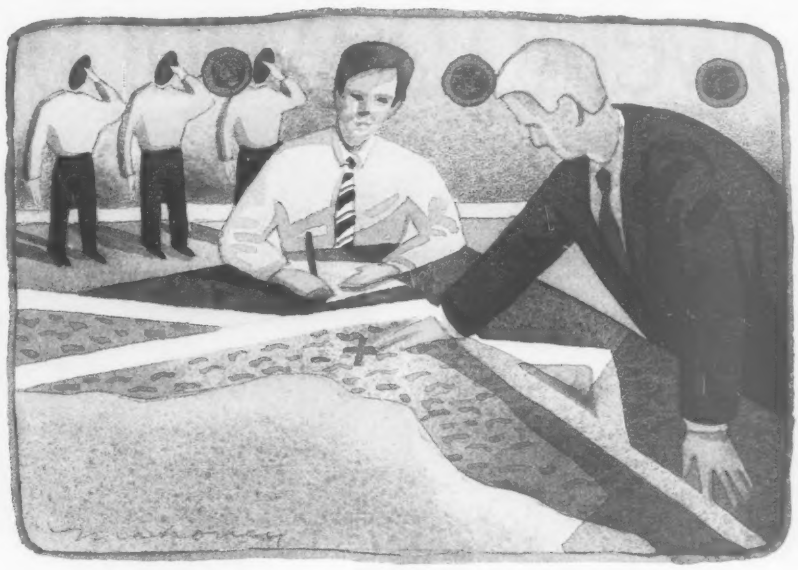

Sailing Orders

WHAT WILL business executives expect in the 1990s? They will expect to lean more heavily on information technology for internal support and help in pleasing customers. They will want someone at the IS helm who talks and thinks like them, who knows how to use technology to keep the company afloat and doesn't keep it to himself.

Survival for the CEO equals realism and a tool called IS

BY JOHN G. SIFONIS

Five years ago, if you had asked a typical chief executive officer to state his company's major goals, he would have listed four: increase shareholders' wealth, expand market share, bolster profitability and deal successfully with the federal government. Ask that same CEO the same question today and he'll give you a one-word answer: survival.

In the second half of the 1980s, top management has been confronted by a battery of challenges — global competition, takeover wars, currency swings, stock market manipulations and upheavals, deregulation — that have undermined the comfortable old assumptions about business in the future. Now, a siege mentality prevails. "Survival is not a given," one CEO says. "Turbulence and chaos on a global basis will increase," adds another.

This fundamental shift in the outlook of CEOs will color all their dealings with information systems staff and technology in the coming decade. Today's CEOs can be divided into four categories on the basis of their view of information systems: idealists, realists, skeptics and antagonists.

Idealists believe technology can solve all their problems simply and cheaply. Realists know that new technology will be costly and sometimes disruptive to implement, but they also realize that it will be essential to remain competitive in the future.

Skeptics distrust technology and view it as a necessary evil, usually because their past IS efforts failed to meet expectations.

Antagonists dismiss information technology as something that has not worked in the past and will not work in the future.

A need for realism

In the 1990s, as the power of information technology reshapes the competitive landscape, idealism, skepticism and antagonism will become untenable attitudes. Survival for a CEO will demand realism — viewing information technology as a potent tool for ensuring survivability as well as for bolstering market share, profitability and global reach, but also understanding that it is a tool that has to be actively and carefully managed to support business strategy.

The technology itself will continue to advance at a breathtaking pace, becoming at once cheaper, more powerful and more functional. Information systems will, in fact, be able to meet any business need that a CEO can specify.

Decisions will, therefore, become a matter of timing and money: When should we implement this system given our competitive and financial position and objectives? Should we pay the premium to be on the cutting edge and gain an advantage over our competitors? Or, will this advantage prove so transitory that it makes more sense to hold off until the price comes down? Or, should we wait for the next, more powerful generation of technology?

A company's IS decisions will, in other words, become business decisions, not technical decisions. This shift will change in a fundamental way the jobs of systems professionals and the criteria used to evaluate their performance. CEOs will be looking for managers with strong, analytical rather than technical, abilities, and technology strategy will become a prerequisite to survival. An understanding of markets, customers and competition will become even more important than a nuts-and-bolts understanding of technology.

Unfortunately, finding professionals who combine technical know-how with outstanding analytical and business capabilities will become increasingly difficult in the U.S. The abysmal high school and college dropout rate in this country — now ranging between 35% and 65%, depending on the area — will translate into a dearth of qualified candidates which will, in turn, directly threaten U.S. competitiveness in the next decade.

Assets to CEOs

On the bright side, those managers who do exhibit both analytical and technical skills will be valuable assets to CEOs. Senior management will look to them more and more to provide input into the highest levels of business decision making.

This new responsibility will require IS managers to hone their communication skills as well as their analytical abilities. In the past, some technical managers have been able to use the complex jargon of the information technology professional to bluff senior management.

The realist CEO of the '90s, however, will know the vocabulary of information technology. An IS manager that lacks business insight will no longer have a place to hide. •

Sifonis is a New York-based vice-president of Temple, Barker & Sloane, Inc., an international management consulting firm.

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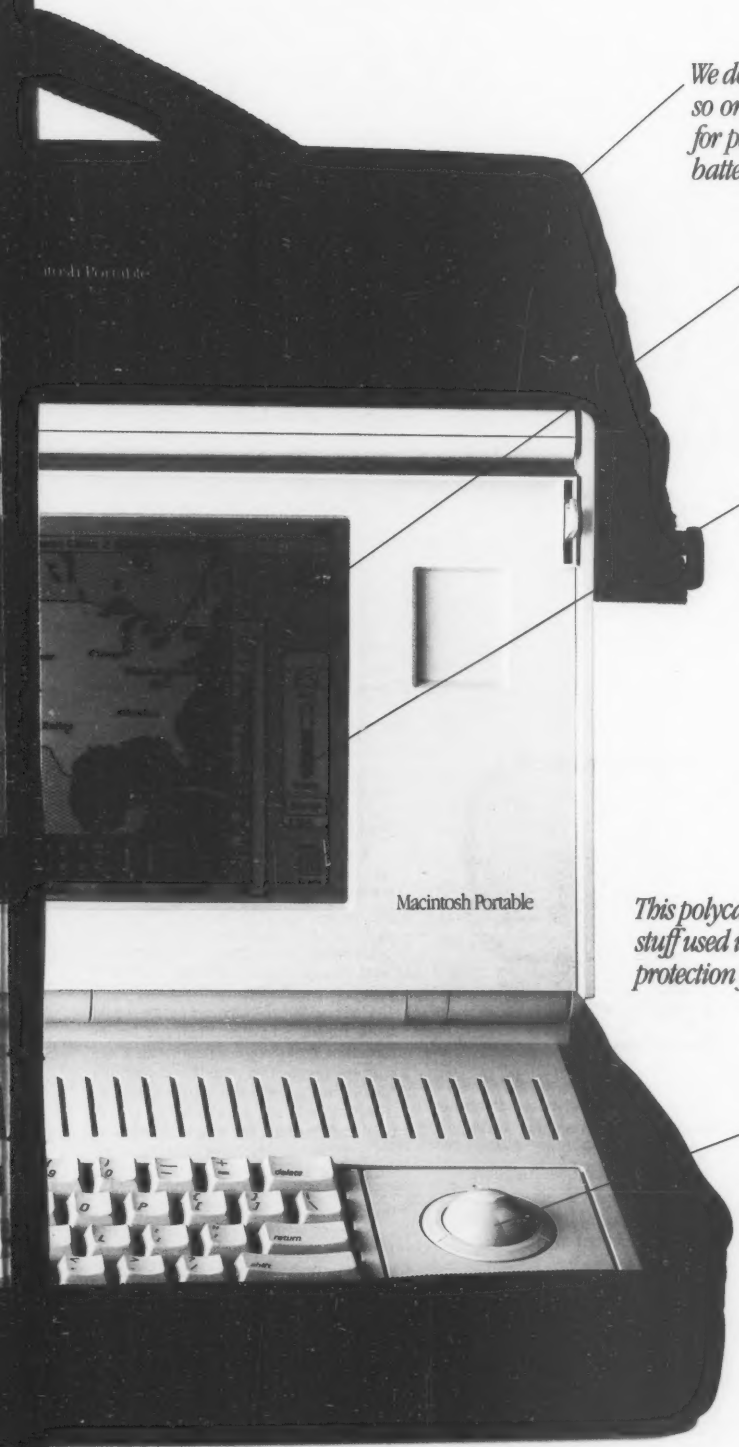

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The cost clause in the new IS mandate

BY LEE KROON

When thinking about information systems in the 1990s, it is instructive to remember the proverb that great opportunities keep company with great risks. During the next decade, management will call on IS executives to maintain the competitive edge in their organization. They will also, however, scrutinize the bills for IS pursuits with a much more critical eye. And, at times, the risks associated with that scrutiny will seem to outweigh the opportunities.

As effective control of complex processes becomes more critical during the next decade, IS will become an integral part of the infrastructure, and many costs currently allocated to non-IS categories will become IS budget items.

The reallocation of costs will cause IS spending to grow rapidly. During the first half of the 1990s, spending within IS should rise about 14% annually, with much of the growth occurring after 1991. Meanwhile, IS spending within end-user departments will increase at a rate of 25% annually.

These rates far outstrip expected growth for corporate revenue during the same period. Many economists are projecting revenue increases in the neighborhood of 6% per year for the largest organizations.

Currently, the IS department budget in a typical Fortune 500 company averages 2% of total revenue, with an additional 1.3% spent by end-user departments. If the projections are accurate, by 1995, the same company will spend 3.1% of its revenue within the IS department and an additional 3.5% on information technology within end-user departments. That will put the total outlay for information systems at 6.6% of revenue, or double the current share.

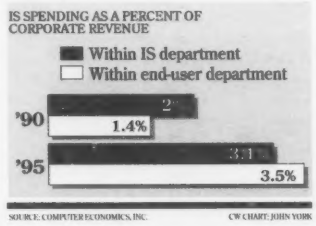
This situation will compel corporate management to ask pointed questions about accountability. It is doubtful, however, that they will obtain the kinds of answers they want to hear.

While other capital expenditures can be cost-justified by determining how the expenditure will increase the speed of a given process, IS expenditures change the process, making accurate measurement next to impossible. This leaves IS executives with the politically sensitive assignment of trying to meet demands for better cost justification, while educating management about the inherent difficulties of the task.

Because spending for information technology will be increasingly dispersed across all departments, corporate managers will feel a greater urgency to determine who has the authority to manage technology. As a result, management may take drastic measures to resolve disputes between IS and end-user departments over technology spending.

Users grab bigger share

By the mid-90s, end users will be spending more on IS than IS departments will themselves



SOURCE: COMPUTER ECONOMICS, INC. CW CHART: JOHN YORK

In some cases, authority will revert to central IS, although not without great resistance from end users. In other cases, standing committees of IS managers and end users will coordinate and authorize acquisitions for the entire organization.

If neither IS nor end users have the vision or the political skill to manage technology effectively, management may consult an independent party. That could mean contracting with an outside firm to guide information systems implementations or creating a new type of internal post.

One possible in-company option would be to appoint a business manager for information technology. The individual occupying this position would be responsible for all information technology acquisition. The post would require a blending of technical and financial know-how. IS managers could be candidates for this type of position, but so could finance department personnel and others within the corporation.

Regardless of the options chosen in the 1990s, IS executives will face many challenges to their authority and credibility. Gaining the kind of influence required to prevail with key decision makers will take more than an education in business administration: It will require the ability to communicate a new vision for the corporate infrastructure and mastery of corporate politics.

IS professionals who acquire these skills will find their positions and authority enhanced. Those who do not may find themselves excluded from the inner circle of technology decision making. •

Kroon is editor-in-chief at Computer Economics, Inc., a Carlsbad, Calif., newsletter publishing firm.

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Rethinking the patterns of hierarchy

BY LESLIE BERKES

IS managers have a big job ahead of them. Over the next few years, they will have to take a leadership role in reshaping organizational structures to permit maximum utilization of information. This is a major executive task, one that demands both vision and an understanding of the mysteries of human interaction.

In the industrial era, the designing of organizational structures was largely a task entrusted to human resources professionals. Some companies even employed organization design specialists.

Traditional hierarchies no longer work. Not only are they deficient in terms of responsiveness to rapidly changing contingencies, but in an age when "span of communication" is more meaningful than "span of control," these hierarchies no longer integrate. Instead, integration emerges around goals, tasks and expertise, with people "wired" to one another in a variety of ways, voluntarily connecting and disconnecting regardless of the "formal" organization.

Dynamic process

Furthermore, in the information age, organization design is a dynamic process, inextricably linked to changing patterns of information utilization. Clearly, such an ongoing process demands management. This is a role for IS. It's just the sort of role that the title "chief information officer" should describe.

It will not be an easy job. It will require an understanding and an empathy for the ways that humans both react to and modify systems. Specification of a system involving people does not make it real. Human systems are designed in process, and all actors are concerned participants.

IS departments are the most isolated groups in companies, with strong intradepartmental networks and weak interdepartmental ones. An equally significant obstacle to an effective CIO role is executive attachment to obsolete perceptions of organization design. Many executives still believe in hierarchies, still think that multiple layers of middle management are necessary and still take it as an article of faith that all things, including IS, can be departmentalized.

A related problem concerns the residue that lives and breathes in our organizations — segmentation, functional specialization and steep hierarchies — tall chimneys into which many problems are thrown, disappear and reappear as so much smoke. In this highly segmented world, organizational problems are decomposed, solutions are suboptimized and incentive systems reinforce cross-functional differentiation, not integration.

The re-education task is formidable in a world where executives have a vested interest in a status quo that has placed them at the top of the hierarchy. But that is what IS managers must do — supply executives with fresh images of what organizations should look like and convince them that formal hierarchies just won't do the job that will be required of organizations during the next decade.

Trying to accomplish this kind of change without a strong ally is probably futile. Therefore, one of the first priorities should be to gain the support of the general manager.

In most cases, obtaining this support will require a change in the existing relationship. Right now, most general managers are conditioned to think of IS as a consumer of resources and a reckless spoiler of their profit-and-loss ratios. IS managers must demonstrate an understanding of and willingness to live by the profit-and-loss code.

Now is the time to start making these changes. If IS managers do not collect the necessary allies and begin the re-education process immediately, the job of managing organizational restructuring — even the title of CIO — may be snatched from their grasp.

One CEO told me that he had purposely selected someone other than an IS professional as his CIO under the assumption that such professionals are too narrow and unable to think strategically. How many more times do we need to hear that? ●

Berkes is vice-president and chief technical officer at Netmap International, Inc., an organizational consulting firm in San Francisco.

IS walks the factory floor at Chaparral

Separatism and status quo are dirty words at this leading low-cost steel producer

BY MARY GROVER

One thing you don't ask at Chaparral Steel Co. is, "What's your title?" Because at the 950-person steel minimill in Midlothian, Texas, they're not big on wearing just one hat. Some of the staff don't even print titles on their business cards. The shipping department performs accounting functions; production staff is involved with sales; and nightguards, or "protective services" personnel, enter data.

According to MIT's Commission on Industrial Productivity in its report *Made in America*, Chaparral stands out, even within the somewhat avant-garde minimill wing of the U.S. steel industry. Minimills are small producers that convert scrap into carbon and low-alloy steels using electric furnaces. According to the MIT commission, they are technological leaders and management pioneers that set particular emphasis on close cooperation with customers.

Chaparral is no exception to those rules. Take Dave Fournie, for example. Two years ago, Fournie was rolling steel as superintendent of the medium section mill. Today, he works in information systems at Chaparral, sharing the stage with Jim Denney, manager of mill integration. Denney joined Chaparral two years ago with a manufacturing systems background and nine manufacturing resource planning conversions to his credit.

This joint leadership arrangement, which combines a long background in steel with manufacturing-specific IS experience, provides Chaparral's 11-person IS staff with a living model of how it is expected to work. "The vision is for [IS] to be part of the production and manufacturing process," Denney says.

It wasn't always this way for IS at Chaparral. In 1979, the first systems group was formed but its vision did not extend beyond data processing. It was not until eight years later, when IS was taken under "the umbrella of production" and began reporting directly to manufacturing, that its charter came to life.

Although this reporting structure is unconventional, doing the expected has never been the goal at Chaparral. When founder Gordon Forward started the company in 1975, he built a company designed for flexibility. Each staff member at every level is given the freedom — and the responsibility — to seek out change, generate ideas for change and share in the accompanying decision making. Nothing gets implemented if it is not accepted from the bottom up.

The search for new ideas extends internationally. Employees are encouraged, for example, to take sabbaticals to Korea and Japan to keep abreast of technological developments. Chaparral also participates in experiments under way at universities such as the University of British Columbia in Vancouver, MIT and the University of Toronto, carrying tests out on the company's own plant floor.

Although the company has achieved the position of the world's lowest cost producer in its market segment, no one, least of all the IS staff, is ready to call the job done.

"The use of strategic computing technology . . . gives us the opportunity to challenge the way we're currently doing business and maybe rethink it," Denney says. "It encourages questioning the status quo."

At least two avenues Chaparral has chosen to pursue are to eliminate its current paper-based ordering and invoicing system and make it as easy as possible for customers to do business with Chaparral. "It's one thing to be the lowest cost producer, but you also have to be the easiest steel company to buy steel from," Fournie says.

STAN WULENSKI

Chaparral's *Fournie and Denney take production seriously*

The department is close to completing the first stage of a four- to five-year project to internally develop a prototype called ISIS, or interactive sales IS. The goal is to integrate manufacturing, finance and marketing so that all three departments work on a single-update basis.

When the project is complete, customers will be able to place an order from any PC, dial into the computer system to check on order status and use electronic mail to communicate with the company. Eventually, Chaparral will be able to accept and acknowledge the order, complete the finished product and, upon shipment, send invoicing information and receive payment without ever having to produce a piece of paper.

Looking further into the future, Fournie and Denney saw a likely increase in customer demand for traceability of products, certification of mill standards, mill specifications and testing reports. As a result, the ISIS project will include getting this information to the client upon delivery of the product.

Domestically, the game seems to be in Chaparral's favor. According to Theo Petersen, a senior consultant at Suite Software and a database specialist who was brought into Chaparral for his relational database management system and fourth-generation language expertise, "The other mills that I've had contact with seem very committed to older computer technology. . .whereas Chaparral latched onto newer technology and were willing to experiment to some degree."

But none of this experimentation would work if Chaparral's holistic approach were not applied. Both Denney and Fournie quote statistics that suggest a 75% failure rate on similar projects at other firms. The reason Chaparral's will not fail, they explain, is that the project has to be accepted — and owned — by everyone at every level of the company. "If it's worth doing, the guy that has to do the work is the one that has to be sold, because management will not dictate something. That just isn't the culture here," Denney says.

Neither is waiting for the future to announce itself. MIT researchers cite the company as a "notable exception" to a widespread laxness in attitude toward process improvement. "Chaparral," they write, "has achieved tremendous improvements in productivity by making a myriad of small changes on a continuing basis."

"We are not a snapshot standing still," one Chaparral employee puts it. "We are a videotape running at fast-forward." ●

Grover is *Computerworld's* chief copy editor.

INTERVIEW

Executive expectations are changing: Problem-solving ranks high

Douglas Maine says that revenue generation will become part of the job

Douglas Maine is a vice-president who heads up finance operations at MCI Communications Corp. Maine recently spoke with *Computerworld* features editor Joanne Kelleher about what senior management will expect from information systems during the 1990s.

Do you think top management is likely to change the way it judges IS performance in the next decade? And, if so, what new kinds of standards will be applied?

I do think it will change. The way most of us measure IS today is by looking at things such as system function, delivery of systems, cost of systems, speed and accuracy of information flow and various expense-to-revenue relationships. All of those factors are reasonably quantifiable and reported at normal intervals.

In the future, however, I believe IS will be evaluated much more on how involved it is in helping to solve business problems, both within the company and for the customer base.

IS will also be responsible for generating and helping to generate new revenue through direct involvement. It is, for example, reasonably common today for senior IS professionals at MCI to go on sales calls in order to help develop unique applications for customers.

If IS is moving into new areas that are less quantifiable, then what kind of standards can you use to judge performance?

It is obviously more nebulous. How do you judge or quantify a good idea? Or how do you judge somebody who is rethinking process or making a recommendation to change the way you do your work? To some extent, that has to be subjective.

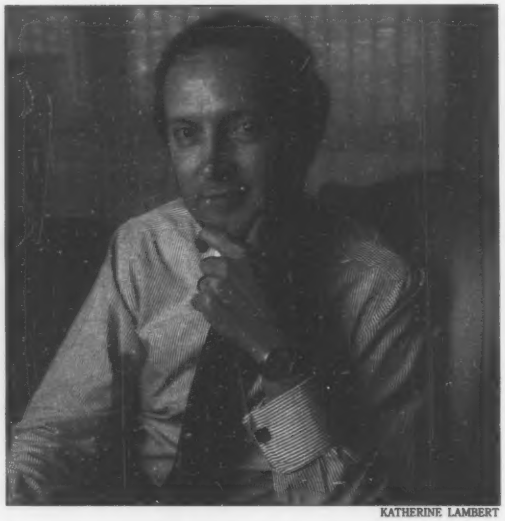
Does that mean top management is going to have to drop some of its bottom-line numbers and expectations?

There's no question that the measures will have to become more of a blending of factors. We non-IS managers need to broaden our view of the IS professional.

We have to create a climate that will encourage their involvement in the business process, recognizing that when that happens, their contributions change dramatically.

It is difficult to talk about how you value that. The way we try to get at it within MCI is by setting a series of goals and objectives. You don't say, "Come up with five new ideas during the year," but you might say, "Here's a process and we want to improve it."

In that kind of a situation, the standard may be a customer survey, which says a process is working better, as opposed to the series of internal measures that may have been used heretofore.



KATHERINE LAMBERT

Is it your feeling that IS should be initiating projects that would expand their involvement with the business and with customers?

There is no question about that. They have got to be proactive. Management has to create a climate that demonstrates they want to hear from IS. But IS professionals also have to take it upon themselves to speak up.

Where did the initiative originate to have IS managers going along on sales calls?

That came from the sales force, by and large. In communications today, dealing with large accounts is a highly complicated business, and our sales force looks to the IS organization for expertise in helping customers solve their business problems.

So your business now involves more customized solutions?

Yes. And that is where our IS professionals are very good. For one thing, they understand both the customer's situation and the technology. Beyond that, though, I've found that IS professionals are very creative people. They are problem solvers by nature.

Going along on sales calls is one specific way of getting involved in business. Are there any other kinds of involvement that you think IS should be striving for?

Definitely. One thing is that in the course of the systems development, IS professionals are really forced to understand and map a process from end to end. Based on the knowledge they gain from that, they could and should make suggestions on how the organization or the user group they are working for could do their work better. Until now, feedback from IS to the users on things other than the system itself has been limited.

Also, both business management and IS management should make an effort to see that IS is right there whenever there is any kind of business problem to be tackled or problem to be solved. Even if IS isn't going to be asked to do something, IS people should be there, just because they are smart and informed and creative and, if you've got a problem, those are just the kind of characteristics that you want involved. •

What your CEO won't want to hear

In the coming years, conventional wisdom will lose much of its power. According to Dudley Cooke, formerly head of IS for Sun Co. and now president of Executive Insight, a firm that advises top executives on use of information systems, some IS assertions that have always been accepted without question are starting to draw fire from senior business managers. Several arguments that Cooke says will probably not wash much longer are the following:

• **"I need more staff to get the job done."** There will be no reason to add staff because IS will use its own tools to improve internal productivity. Technologies like CASE will allow fewer people to do more work better.

• **"My IS plan does not fit the business plan because I didn't know we shifted strategy."** The CIO will have responsibility for aligning his strategy with that of other executives. He will have to use informal channels to stay aware of changes and work to win entry into decison-making sessions.

• **"Outsourcing won't work because contract staffs aren't as reliable."** Such blanket statements should be avoided. In well-chosen situations, contractors can provide better cost-efficiency and specialized skills.

• **"The project is over budget and late because of lack of user support."** Blaming users won't work. It will be critical to learn how to elicit early and significant user input. Running many small prototypes with users will help.

• **"If we were centralized, I could get better control."** The mindset of control through centralization will not be accepted. Leaders will be needed who can manage context without having to manage content.

• **"My budget needs to be increased because of increased workload."** Costs in the '90s will be more controlled. If an IS organization can't keep costs down to match comparable services from outside providers, the function probably ought to be outsourced.

• **"Our systems will not support the new business strategy without a major investment of time and money."** There won't be time for retooling after the fact. Support will have to be in place almost as soon as a strategy is announced. Recognizing this, IS executives should move their quickly to new platforms and systems built for flexibility.

• **"It will take 12 to 24 months to match our competitors' systems because they got a head start."** The time estimate is probably right if you have played a waiting game. But many CEOs will expect IS to monitor the competition aggressively so that it isn't necessary to catch up after the fact. Competitive intelligence will continue to be a serious part of the CIO's role. His job will include selling management on new initiatives.

Directions

THE WATERS are full of sharks, but you have to keep looking forward. If you don't, the company could go off course or drive full steam into unseen shallows. The thing to remember in dealing with sharks is this: Most are more snap than substance and are easily subdued if you know how to hook them just right. Find yourself some people who know that skill and concentrate on keeping to the proper bearings. Those are the ones that will swing the company away from production obstructions, around competitive barriers and into the wide and clear channels of new markets.

Daring to alter the way sales works

BY JOHN M. THOMPSON

If you want to know how information technology can make sales and marketing more effective during the next decade, don't look at companies that are doing well. By and large, those that are doing well today are doing nothing in this regard or, even worse, are re-automating the existing way of doing things. Rushing to invest in laptops for salespeople and order-entry terminals for customers accomplishes nothing unless someone stops to ask how current processes could be improved — not only for the salesperson but also for the customer.

There are a few organizations in North America and Europe that are asking the right questions, and they share at least one important characteristic: They are not doing very well at the moment. As Dr. Samuel Johnson said, "It focuses a man's mind marvelously when he is to be hanged in the morning."

Those who face a direct threat today are most willing to change in order to survive tomorrow. They are using the power of information technology to completely change the way their customers deal with them. They are determined to become the "easiest to do business with" in their industries, thereby earning respect from their customers and striking fear in competitors. The change that these companies are effecting and to which we will all have to face up is this: taking the customer's point of view. That sounds facile, but it is difficult to do.

Take two illustrations. Look at the nonsense that suppliers put their sales forces through — sales forecasts, call reports, market intelligence, expense reporting, account plans and so on. Accumulating all this information seems necessary because it has always been done. Talk, however, to most marketing departments and you will see that they think they *ought* to need it but have not actually figured out yet what to do with it all.

When these tasks are automated, the resulting complex systems — brilliantly engineered to fit into a portable device, travel anywhere and interface with existing corporate systems — may be technically elegant, but one is reminded of another of Dr. Johnson's observations: "It is like seeing a dog trained to walk on its hind legs; one marvels not that it is done well but that it is done at all."

Take another example. Everyone knows that customers judge suppliers not on what the supplier sells them but on the total experience. If the supplier loses its luggage, it begins to doubt its ability to pilot the plane as well.

Yet the supplier manages the customer's experience in a fragmented way, not in the holistic manner by which the customer judges the supplier. Examine all the points at which your customer comes into contact with someone in your organization: sales, order processing, customer service, technical support, credit, shipping and so on. For total

Continued on page 18

Thompson is vice-chairman of Index Group, Inc., a Cambridge, Mass.-based management consultancy in information systems. He is also director of the firm's European operations.

Recasting plant processes

BY GEORGE SCHIMMEL

Two major trends will drive the use of information systems in manufacturing during the 1990s — the further development of computer-integrated manufacturing (CIM) and the changing relationships between large manufacturers and their suppliers.

CIM has been viewed as a long-term strategic approach to improving and maintaining a competitive position in large-scale manufacturing. It includes tying together large segments of the plant floor and other areas of the enterprise in an integrated way to allow for widespread information flow.

While automation is often viewed as simply a way to reduce labor costs, CIM technologies promise a lot more. The greatly improved flexibility in manufacturing with CIM technologies allows not only for reactions to problems on the plant floor but also for large savings through the production of smaller lots.

CIM technologies also provide savings through higher quality production, with reduced scrap rates and reworking. Perhaps the largest benefit CIM promises is in reduced time to bring products to market, which may well be one of the most significant factors in global competitiveness. However, CIM technologies present particular challenges to IS and other computer-related groups within manufacturing corporations.

A second but related trend, the changing relationships between large manufacturers and their supplier bases, requires a higher degree of cooperation (and hence integration) between supplier firms and their large clients. The trend toward flexibility in manufacturing implies tightly coupled scheduling and the rapid movement of design and quality information between client and customer.

The implication is that networked information systems

Continued on page 18

Schimmel is manager of the distributed software manufacturing program for the Industrial Technology Institute in Ann Arbor, Mich.

NetWare 386 makes it easy

Netware 386 said to come close to minicomputer speed

BY PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — "Netware for the '90s" debuts at the Palace of Fine Arts here today, where sources say Novell, Inc. will paint a robust picture of the long-awaited Netware 386. The 32-bit network software will run over both Intel Corp. 80386 and 486 systems, eventually offering up to 10 times the performance of its predecessor and support for up to 1,000 users.

"It's definitely a screamer," two sources said independently. The server capability announced is expected to take local-area networks up the ladder to compete in terms of capacity with minis and superminis.

Novell will detail a two-year release strategy for Netware 386 and outline plans for various product announcements throughout 1990, said sources briefed by the firm. Licensees of Portable Netware, a Unix port that requires Netware 386, are slated to attend along with providers of various 386 servers.

A single Netware 386 server will be demonstrated supporting 250 users located on four LANs, including two DOS, an Apple Computer, Inc. Appletalk and an OS/2 LAN, according to industry sources.

Netware 386 will be released in two stages: Netware 3.0 will ship in the third quarter along with a tool kit for Netware 3.1, which will ship in early 1990.

Sources said Netware 3.0 will include vastly improved performance, security and disk capacity; virtually "unlimited" numbers of files and volume sizes; use of the 386's virtual 86 mode to eliminate the 64 byte partition for applications, reduced system overhead; more built-in services.

A modular approach will Novell to mimic 3Com's recently announced Protocol Architecture, lets users drop in and cific protocol stacks as sources said. This will eliminate the need to dedicate a personal computer to each gateway.

Netware 3.1 will feature a communications server, the ability to support multiple protocol stacks and support for OS/2 LAN Manager's Named Pipes interprocess communication protocol on the server — the latter a significant reversal in strategy, said one analyst.

The long overdue and much-talked-about global naming facility, which is expected to resemble Banyan Systems, Inc.'s Streettalk, will ship as an upgrade to 3.1 at the end of 1990, a source said. Also on tap is an X.400 mail gateway that supports Novell's Message Handling System mail protocol.

Computerworld

Novell Brings 'Horsepower' To NetWare

BY TIMOTHY HAIGHT

SAN FRANCISCO — Novell Inc. last week unveiled NetWare 386—its fastest, most extensive, and ultimately, most open local area network operating system yet.

The Provo, Utah, LAN company also showed off new hardware and software developers' kits, and detailed its strategy to make NetWare an enterprise-wide network computing platform.

Users generally lauded the strategies and the new products, many of which had been expected (*CommunicationsWeek*, May 1). But several customers called for Novell to execute parts of the strategic plan more rapidly; some of the vendor's most important feature additions won't arrive until mid-1990.

"NetWare 386 is very significant, because it will allow Novell not only to add more users on a network but also to provide better management facilities and more horsepower for each job," said Bill Connett, director of computing for the University of Michi-

Communications Week

Novell wows users with NetWare 386

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — As expected, Novell, Inc. took the wraps off NetWare 386 here last week, promising 500 attendees of its 5th Annual Developers Conference that the first release will be out by early fall.

Designed for Intel Corp. 80386-based systems, the latest version of NetWare is a 32-bit network operating system that supports up to 4G bytes of addressable memory, 32 terabytes of

Network World

Netware 386 Will Triple Power of Current Version

By Rachel Parker
And Mark Stephens

Bringing new firepower to its network operating system war with Microsoft Corp., Novell Inc. will announce its next-generation Netware 386 product today at San Francisco's Palace of Fine Arts, according to sources briefed by the company.

Offering what Novell has said will be at least three times the performance of the company's current top-of-the-line Netware 2.15, Netware 386 is a complete rewrite of the Netware operating system and runs in protected mode on 80386-based file servers. The product is intended to blow the doors off its major competitor, Microsoft OS/2 LAN Manager, which runs in 80286 protected mode as a task under OS/2.

Novell is not expected to abandon its 286-based Netware 2.1X product line.

Novell president Ray Noorda told financial analysts and investors attending the Hambrecht & Quist conference last week in San Francisco that Netware 386 will ship within 90 days. Sources close to the company said an August or September ship date is likely.

Netware 386 is expected to be priced in the $7,000-to-$8,000 range, substantially high-

See Netware, Page 93

InfoWorld

NetWare 386 Preview: Speedy New Release Was Worth the Wait

Editor's Note: Since early July, Novell Inc.'s NetWare 386 operating system has been beta tested at several sites across the country. Presented on this page and the facing page are the opinions and experiences of two beta testers, one at Martin Marietta Data Systems and the other at the University of California at Los Angeles. NetWare began shipping last week, according to Novell officials.

By Garry Frenkel

By now most people interested in LANs have heard and read a great deal about Novell's new NetWare 386. Longtime Novell users have eagerly awaited NetWare 386, and as a beta-test user I can easily say that it was worth the wait.

From the use of 1.2M-byte floppy disks (finally), to the scaled-down but still excellent documentation, to the simple installation (yes, it really does take less than 20 minutes), to the increased functionality, to the near-blinding speed, Novell has done a splendid job.

In our lab at Martin Marietta Data Systems, we have seen applications running on a NetWare 386 server show performance improvements of greater than 40 percent over a NetWare 286 server. This is impressive. The improvements in security are also welcome. Passwords are now encrypted at the workstation before being transmitted to the server.

For users running older versions of the workstation shell, the server can be set to allow unencrypted passwords.

In the past, our monitoring equipment was easily able to read the NetWare passwords as they were transmitted to the

PCWeek

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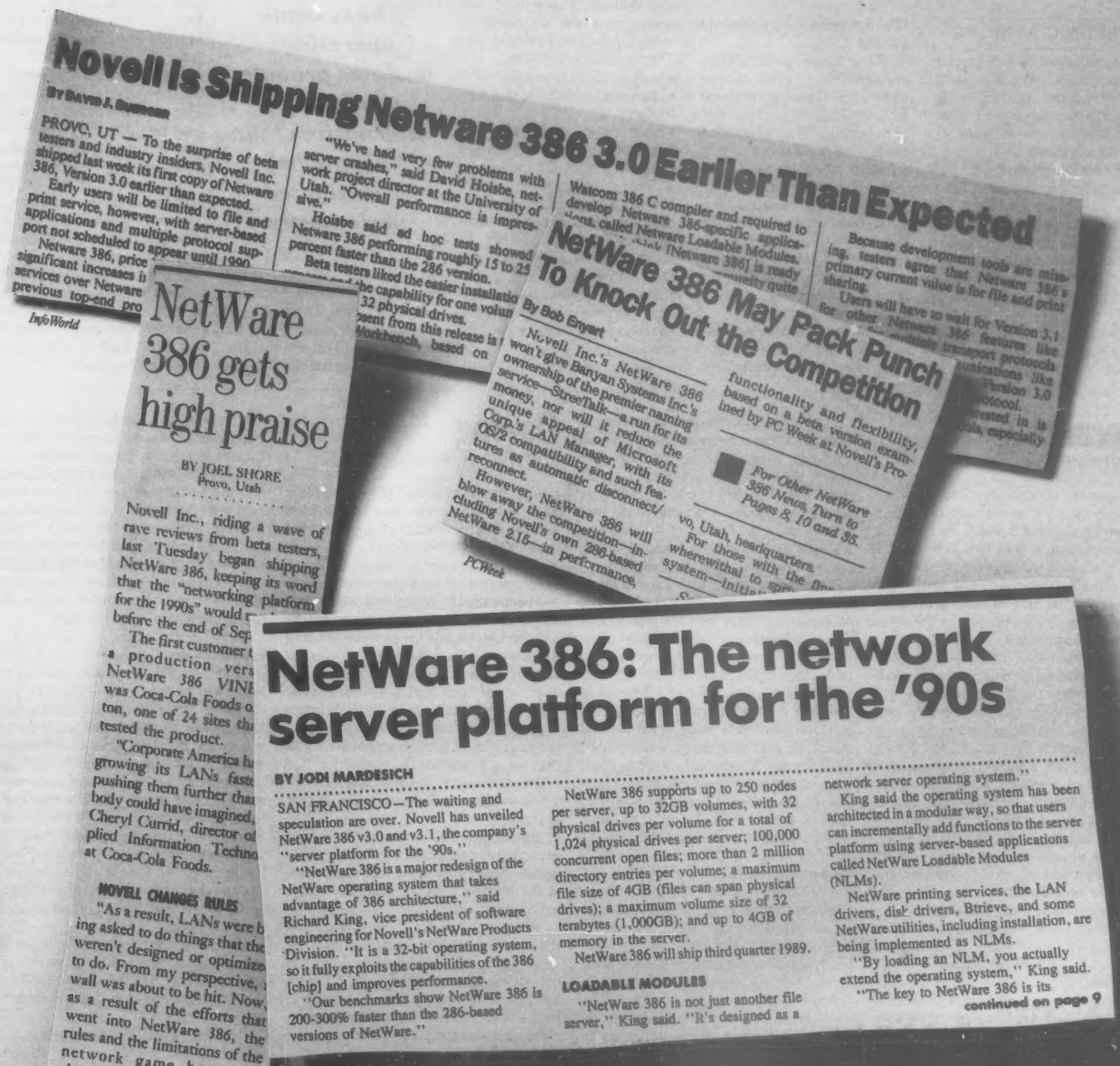
to believe what you read.



Novell Is Shipping Netware 386 3.0 Earlier Than Expected

BY DAVID J. [illegible]

PROVO, UT — To the surprise of beta testers and industry insiders, Novell Inc. shipped last week its first copy of Netware 386, Version 3.0 earlier than expected.

Early users will be limited to file and print service, however, with server-based applications and multiple protocol support not scheduled to appear until 1990.

Netware 386, price [illegible] significant increases i[illegible] services over Netware previous top-end pro[illegible]

"We've had very few problems with server crashes," said David Hoisbe, network project director at the University of Utah. "Overall performance is impressive."

Hoisbe said ad hoc tests showed Netware 386 performing roughly 15 to 25 percent faster than the 286 version.

Beta testers liked the easier installatio[illegible] the capability for one volu[illegible] 32 physical drives.

[illegible]cent from this release is [illegible] Workbench, based on

Watcom 386 C compiler and required to develop Netware 386-specific applications, called Netware Loadable Modules. [illegible] [Netware 386] is ready [illegible] quite

Because development tools are missing, testers agree that Netware 386's primary current value is for file and print sharing.

Users will have to wait for Version 3.1 for other Netware 386 features like [illegible] multiple transport protocols [illegible]unications like [illegible] Version 3.0 [illegible]otocol. [illegible]ested in is [illegible]ols, especially

InfoWorld

NetWare 386 May Pack Punch To Knock Out the Competition

By Bob Enyart

Novell Inc.'s NetWare 386 won't give Banyan Systems Inc.'s ownership of the premier naming service—StreetTalk—a run for its money, nor will it reduce the unique appeal of Microsoft Corp.'s LAN Manager, with its OS/2 compatibility and such features as automatic disconnect/reconnect.

However, NetWare 386 will blow away the competition—including Novell's own 286-based NetWare 2.15—in performance, functionality and flexibility, based on a beta version examined by PC Week at Novell's Pro[illegible] vo, Utah, headquarters.

For Other NetWare 386 News, Turn to Pages 8, 10 and 35.

For those with the fin[illegible] wherewithal to spri[illegible] system—initia[illegible]

PCWeek

NetWare 386 gets high praise

BY JOEL SHORE
Provo, Utah

Novell Inc., riding a wave of rave reviews from beta testers, last Tuesday began shipping NetWare 386, keeping its word that the "networking platform for the 1990s" would r[illegible] before the end of Sep[illegible]

The first customer t[illegible] a production vers[illegible] NetWare 386 VINE[illegible] was Coca-Cola Foods o[illegible] ton, one of 24 sites th[illegible] tested the product.

"Corporate America h[illegible] growing its LANs faste[illegible] pushing them further tha[illegible] body could have imagined," Cheryl Currid, director of[illegible] plied Information Techno[illegible] at Coca-Cola Foods.

NOVELL CHANGES RULES

"As a result, LANs were b[illegible] ing asked to do things that the[illegible] weren't designed or optimize[illegible] to do. From my perspective, [illegible] wall was about to be hit. Now[illegible] as a result of the efforts that[illegible] went into NetWare 386, the[illegible] rules and the limitations of the[illegible] network game have just[illegible] changed. Novell has pushed[illegible] the wall back," said Currid.

As part of its development program, the product under[illegible] went vigorous beta testing at 24 sites, including United Parcel Service, Martin Marietta Corp., Southern California Edison and Oregon State University.

"Comments from our [beta]

Computer Reseller News

NetWare 386: The network server platform for the '90s

BY JODI MARDESICH

SAN FRANCISCO—The waiting and speculation are over. Novell has unveiled NetWare 386 v3.0 and v3.1, the company's "server platform for the '90s."

"NetWare 386 is a major redesign of the NetWare operating system that takes advantage of 386 architecture," said Richard King, vice president of software engineering for Novell's NetWare Products Division. "It is a 32-bit operating system, so it fully exploits the capabilities of the 386 [chip] and improves performance.

"Our benchmarks show NetWare 386 is 200-300% faster than the 286-based versions of NetWare."

NetWare 386 supports up to 250 nodes per server, up to 32GB volumes, with 32 physical drives per volume for a total of 1,024 physical drives per server; 100,000 concurrent open files; more than 2 million directory entries per volume; a maximum file size of 4GB (files can span physical drives); a maximum volume size of 32 terabytes (1,000GB); and up to 4GB of memory in the server.

NetWare 386 will ship third quarter 1989.

LOADABLE MODULES

"NetWare 386 is not just another file server," King said. "It's designed as a network server operating system."

King said the operating system has been architected in a modular way, so that users can incrementally add functions to the server platform using server-based applications called NetWare Loadable Modules (NLMs).

NetWare printing services, the LAN drivers, disk drivers, Btrieve, and some NetWare utilities, including installation, are being implemented as NLMs.

"By loading an NLM, you actually extend the operating system," King said.

"The key to NetWare 386 is its

continued on page 9

LAN TIMES

NOVELL

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Growing interest in outside services

BY DOUGLAS WILDER

The practice of contracting other companies to run all or part of an information systems operation will become one of the hottest markets in the IS industry in the decade ahead.

By 1988, the market reached $4.8 billion, according to Input. The latest forecast indicates it will grow to almost $12 billion by 1993. Recent announcements, including Eastman Kodak Co.'s agreement to contract for part of its IS operation to be run by IBM, are going to accelerate this growth.

Wilder is director of systems integration at Input, a market research firm in Vienna, Va.

The systems operations business provides a variety of alternatives that should be reevaluated periodically by systems users and buyers. The alternatives range from professional services offerings, where the vendor provides personnel and management to run the client's applications and equipment on the client's premises, to remote processing approaches, where the vendor runs the client's applications on the vendor's equipment in the vendor's facility.

Recently, new concepts such as remote lights-out operations have also been introduced. These services result in benefits such as reduced investment in equipment and facilities as well as the elimination of operation staffs.

Basic market forces are driving and stimulating the growth of this industry. These forces are deep-rooted and not likely to change in the foreseeable future. They include the following:

- Globalization of markets.
- Increasing worldwide competitive pressure.
- Shortening product cycles.
- A continually growing services component of the U.S. economy.

These trends and the accelerated growth of information technology translate into senior management's desire to apply IS solutions in ways that were not even conceived of just a few years ago. Unfortunately, many of these solutions are complex and include advanced technology applications.

The continued growth of the information services industry will profoundly affect chief information officers and internal IS organizations. IS executives will need a balanced view when recommending whether the internal or external resources should be used to develop, integrate and operate systems. They will need to evaluate all existing and future systems to ensure that the implementation and/or operations decisions are the most cost-effective and that internal resources are applied where they will be most effective.

The systems operations business provides a variety of alternatives that should be reevaluated periodically.

Applications run and maintained by internal IS shops today require tremendous development and operating resources. They affect the ability to develop and run new strategic applications.

Information services firms offer solutions to this dilemma. They can aid in building new systems and provide a vehicle for contracting out the operations and maintenance of old systems.

These alternatives are not new, but as information services companies grow in size and experience, they provide new and expanded capabilities. Experienced firms have developed disciplined and repeatable development methodologies and program management capabilities that result in high-quality systems solutions. ●

Recasting

CONTINUED FROM PAGE 15

will span not only an organization but will actually span all the way out to supplier firms. This level of connectivity is difficult to accomplish in that it is new to U.S. manufacturing and requires great change in both client and customer firms. The U.S. industrial base of small firms traditionally lags behind the rest of the world in these technologies.

The changes will impose some specific requirements on IS. Three areas immediately affected are the technologies, the professional roles and the organizational roles within manufacturing enterprises.

Large-scale CIM applications will require distributed software running on a wide set of machines. CIM applications will, by necessity, span large administrative systems as well as factory-floor devices. The large demand for such applications is already fueling moves toward standardization of communications and operating system services as well as software components. As this trend continues, much more sophisticated software development, operations and maintenance tools will be required.

These radical changes in U.S. industry will force some changes in the technical roles of various groups within the IS field. The boundary between management information systems and plant-floor operations must change to allow for this level of integration. Traditionally, the different focus and different technical backgrounds of these two groups has hampered communication between them.

CIM applications will require two perspectives to merge more effectively: the data flow focus of IS professionals and the control flow view of manufacturing engineers. Innovations such as the Manufacturing Messaging Specification (MMS) and distributed database systems were designed to support both views in the underlying communications and operating system services. For example, via MMS, information on the plant floor can be managed as an extension of the IS databases, while management data can be available as a global variable to the plant-floor control applications.

The systems development process to take advantage of these innovations is still evolving. Managing the interface between these traditionally distinctive domains may also give rise to the manufacturing information engineer. This new role is analogous to that of the database administrator; namely, managing information flow to and from the plant floor.

Organizational changes will also be required in response to these trends. The adoption of large-scale CIM applications requires planning activities to span organizational boundaries much more than past compartmentalized efforts.

In addition, distributed applications and data require the management of information across a wide organizational structure, even into supplier companies. Traditionally, trends such as these would suggest a move toward centralized control of resources. Currently, however, there is a trend toward more distributed resources in the form of workstations.

Opposing trends

The challenge of the IS world of the 1990s is to manage these seemingly opposite trends. Large-scale distributed CIM applications, potentially involving hundreds of machines, are already pressuring the development of new techniques in application management.

In this framework, the management of information becomes the key and may be distinct from the management of the individual machines. It will fall to IS groups to coordinate the definition and flow of information globally across the enterprise.

IS will also play a key role in working with the CIM planning function and help define the external data requirements for the more locally focused domain groups such as marketing, engineering and production. These domain groups will be responsible for specifying their own global data requirements. They will also be responsible for meeting requirements for the maintenance and validity of their specific enterprise information.

This interdependence implies careful planning and cooperation across these integrated corporations. The critical planning process may work with supplier firms to include the information requirements that will be imposed on them. ●

Daring

CONTINUED FROM PAGE 15

quality in their jobs, each of your people in those functions needs information from another function. But are they supported in this way by systems today?

If this is not clear to you, try making a sales call to your customer when he has just been called by your credit department about the last invoice — which, by the way, he has not paid because the shipping department back-ordered the machinery that he needed. He had to replace the ones he had been having a lot of trouble with and was talking to your technical support people about the situation. You, the salesperson, have no way of finding all that out as you go for the next order. Nor do any of the other departments have the whole picture on where you are with that customer.

Automating the salesperson's call-reporting forms is just not going to give a corporation competitive advantage because it simply does not make any difference to the customer.

Instead of looking at the world from the organization out, corporations must begin to examine themselves from the outside in. What is it like to do business with us? What can we change to make it easier to do business with us and to provide total quality in all of our customer dealings?

Start by identifying all your customer interfaces from your customer's point of view, analyzing all the data that is needed to deal with customers competently and efficiently. Note how much of the necessary data comes from other groups within your company. Progressive organizations are now building systems that allow data to flow among departments.

As organizations move to create this superior infrastructure, some will not restrict their efforts to what they have always provided. They will ask, "What else can we do for the customer? What else does he buy? Can we deliver those other items to him by working with our 'noncompeting co-providers'?"

Here, information systems can give a company competitive advantage: Go to your noncompeting co-providers and offer (for a fee) to provide your mutual customers with the same superior service for their products as you do for your own.

A French brewery, for example, began offering restaurants the ability to order food and nonalcoholic beverages through its own order-entry terminals. These items were produced and even shipped by different corporations, but the brewery pocketed the fees *and* kept control of the channel to the customer — thereby the opportunities for future business.

Establish dominance

By doing something similar, you can enhance the value of your systems to your customer, make his life easier and make a little money from the noncompeting co-provider at the same time. After you have done this a few times, your competitors will notice you have achieved dominance of the channel, and anyone else who wants to suggest his way of doing it will encounter resistance from your happy customer.

Many companies today are working on the architecture for the cross-functional systems that are required to provide total customer service. Two approaches seem to be emerging.

The fortunate ones who can scrap (or build alongside) their existing systems are starting fresh and developing systems that are organized around customer databases.

The majority is faced with the legacy of years of automating by function and product, and they are designing delivery platforms that can take data from the old systems through well-defined gateways into new customer databases, which then form the platform for the customer satisfaction systems. Strict rules apply: The original code must not be touched, and the data may only exit through the walls built around these original systems in rigorously proscribed ways.

We talk about customer obsession and being customer-oriented in this era of increased global competition, but few of us have really thought about what that means in terms of reorienting ourselves and our systems. In many ways, it is easier for those who are not doing well to think about changing old habits, and the winners of the next decade will be those who do just that. ●

INTERVIEW

Building competitive advantage by extending information systems

Michael Porter gives his views on the role IS can play in strategy development

The creator of the leading framework for analysis of strategic advantage, Michael E. Porter is a professor at Harvard Business School and a counselor on competitive strategy to leading companies, ranging from AT&T to Westinghouse. He has written nine books, including the widely recognized *Competitive Strategy: Techniques for Analyzing Industries and Competitors.* Porter was interviewed by *Computerworld* Senior Editor Michael Sullivan-Trainor about the role of information systems in competitive strategy.

What role does information systems play in competitive strategy in the companies you observe?

It's quite clear that in virtually every industry, information technology is becoming one of the principal tools by which firms gain advantage in their markets through either cost or differentiation. Its importance in gaining competitive advantage grows from the fact that information technology can affect literally every activity in the firm.

Information technology is also reshaping the nature of competition in industries. Even if one company can't get an advantage, it's changing the rules of the game, so you have to have new assets and new skills to stay in the game.

A good example is retailing. A retailer that doesn't have state-of-the-art point-of-sale terminals and inventory control systems simply won't be effective. It won't be able to compete. The standard has been changed in that industry because of the advent of information systems.

What ways will information technology be influencing competitive advantage in the future?

At the lowest level, information technology simply automates something you're already doing. When you move up the hierarchy, technology not only automates what you are doing, but it enhances it. It can add new features and attributes whether that is in order processing, production systems or billing.

At the next highest level, technology allows you to link one activity with another. For example, a stand-alone order processing system can now be linked with an inventory system to make the company even more effective in doing both functions.

Farther up the hierarchy, you can even share systems across different businesses. For example, you may have an automated warehouse making certain products. Technology allows you to use that same warehouse to make a new set of products, allowing it to run at a higher scale and be more efficient.

In the final extreme, information technology can totally transform the way an entire business is done. For example, many of the financial service businesses have been transformed. They just don't look anything like they used to.

At what level are companies taking advantage of information technology today?

In most companies, we're still at the lower orders — that is, we're primarily still automating and tweaking what we were doing before. But the real payout of information technology is the linking, the reconfiguring, the connecting of businesses and business functions. That's where the future lies.

We went from centralized IS functions where we were crunching large amounts of data to distributed functions where there are lots of separate applications out in the company. That was a logical way to move to the lower-order systems. But now, to get the real payout, you've got to reconnect all these systems again.

The world of the next decade is going to be a world where people struggle with how to connect systems back together, how to make them compatible, how to make them communicate, how to deal with the complexity of systems that span many activities within the firm and cross functional boundries. Those are the challenges.

How will that affect IS organizations?

The technological demands and the way you organize for doing that are different. I think we will see a partial recentralization of the IS function because information systems will span increasingly large chunks of the company. Therefore, there is going to be more of a need for a central direction and vision again. We've been through a period where the real emphasis was to get all the company excited and active in information systems.

Company after company is hitting the wall because they discover, to their dismay, that all the things they've got are unconnectible and have to be redone. The state-of-the-art custom software houses are getting more and more business in these megaprojects — complicated connecting of different systems. That will be a thriving business in the coming years.

Some companies have departments or divisions that are farther up the hierarchy than others. Does this piecemeal approach provide much of an advantage?

It always helps to be farther along than your competitors. But it will be increasingly necessary for the entire company to be farther along the hierarchy than competitors. The real payout is reconfiguring what you do, and that requires that many functions have to change. Just having one great system in your purchasing department is good, but the real payout is having a consistently high-level use of these systems across the board.

What role should the IS managers play in solving these problems?

The critical role for the CIO will be in setting standards, ensuring compatibility and creating interfaces. Unless those are put in place, the company hits a wall when it tries to connect its applications. Closely following that mission would be creating some ways of discriminating and ranking different projects.

Clearly, we want to give priority to information systems in those parts of our business that have the greatest impact on competition. If we're in a business where cost is the most important factor and manufacturing cost is crucial, then we want to pour a lot of IS resources into that area. Going beyond that, I think the challenge in capital budgeting for information technology is to find ways of valuing second-order effects.

FRANK SITEMAN

It's pretty easy to value the first-order effects: you're going to reduce a certain number of people, you're going to reduce your square footage of space by such and such — that's easy. The second-order effects are how to value the increased speed of responsiveness, how to value the additional features that you can provide to the customer because you have an information system and how to value the inventory savings in your warehousing operation. Managers need to build in ways to explicitly add those benefits into their capital budgeting analyses.

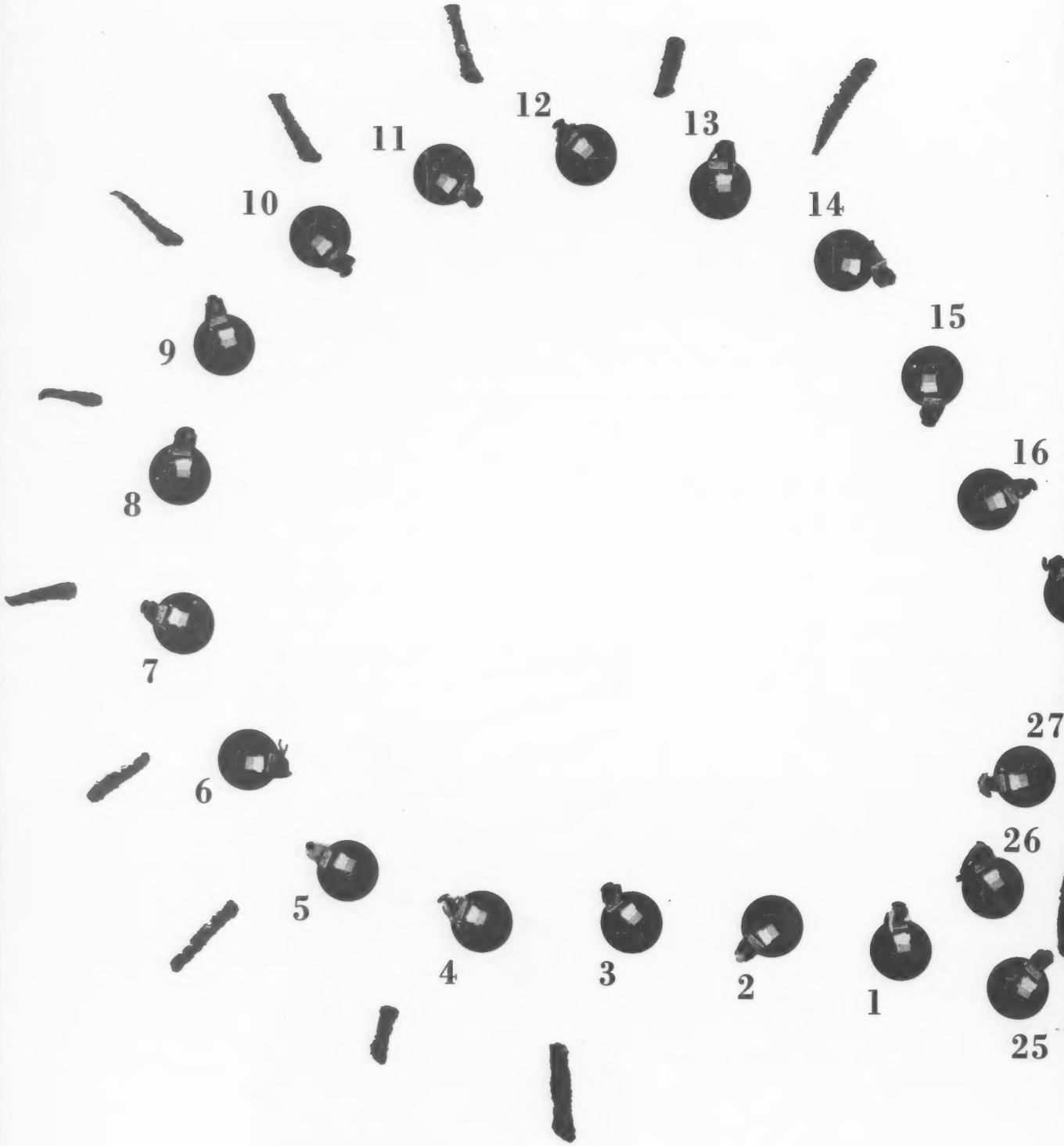
Do you find any companies that do not understand the importance of IS in competition?

Relatively few companies today would not at least say it's important. But if you think about whether they are actually translating that statement into behavior, it's another matter. There are widely differing levels of commitment. The level of commitment has to do with the comfort level of senior management with technology and whether the company has had any IS successes in its own history. The awareness is there; it's a question of what they're doing about it.

Will IS professionals move into different roles to accomplish these objectives?

The history of strategic planning is a good model for that. Historically, there were Brahmans called strategic planners, and they did the plans. Now, their role has totally changed. Good planners are facilitators and advisers and coaches, but they don't do the plans. The line managers do the plans. Any company that has the strategic planners doing the plans is in trouble. That's the process we're going through with information systems.

But there is also a critical overarching function for an IS executive because these systems cross boundaries. Assuming that all CEOs don't become instant experts in information technology, there's going to be a role for a staff advisor to the CEO or the business unit whose principal role will be standard-setting, architecture and training. •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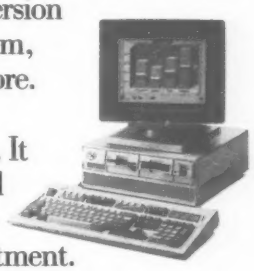

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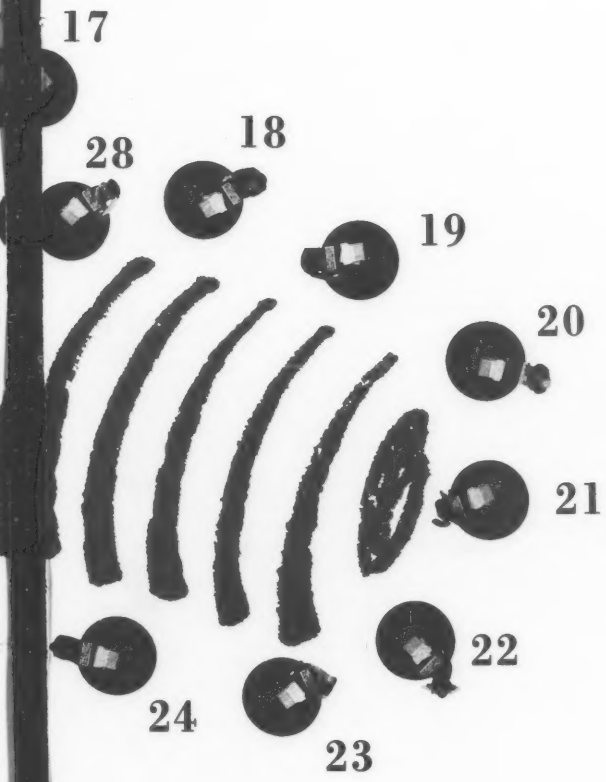

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Electronic links create new market dynamics

BY ROBERT BENJAMIN

A new type of business opportunity is in the making as electronic linkages among companies begin to evolve from narrowly defined distribution channels into electronic markets.

An electronic market creates direct links among multiple buyers and sellers. It is related to, but distinct from, two other types of electronic linkages that are now more prevalent — open and closed distribution channels.

An open distribution channel is usually an industrywide effort to electronically process transactions between buyers and sellers. The major objectives are to shorten delivery time, cut back on paper processing and reduce inventory costs. The buying group tends to be the dominant element in such arrangements and thus has a vested interest in promoting standards. The widespread adoption of electronic data interchange within the auto industry — led by the Automotive Industry Action Group — is a major example of this type of channel.

Control switch

By contrast, closed distribution channels tend to be controlled by a single supplier, which uses the linkage for competitive advantage. The most famous ones are the American Hospital Supply (now Baxter Healthcare) system, which electronically links hospitals with that medical supply company, and the McKesson system, which does the equivalent for drug stores.

Electronic markets represent a much broader application of the technology for electronic linkage. Although they may be created and owned by one supplier, they serve as a many-to-many connection between suppliers and purchasers. Participating suppliers derive the advantage of reaching a larger group of buyers than would be possible through their own distribution channels, and they pay for that.

Buyers get the advantage of being able to compare the prices, delivery schedules and other features of products or services from many suppliers. Needless to say, the creator of the electronic market possesses what is a valuable business in its own right.

Undoubtedly, the most well-known example of electronic markets is that of the airline reservation systems, which enable travel agents to book tickets for airlines, hotels and cars with all the important players on the supplier side. Many more electronic markets are already in operation, however, and research that I have done, along with fellow researchers Joanne Yates and Tom Malone of MIT's Sloan School of Management, indicates that systems of this type will be the fastest developing area in electronic linkage during the next few years. A few examples of electronic markets already in existence include the following:

- A system operated by Synthesis-Que, which links major electronics distributors and their customers.
- An electronic market for cotton provided by Telcot.
- An electronic market for emergency airplane parts called Inventory Locator Services, which has been operating successfully for several years.
- A system for electronic marketing of real estate developed by Planning Research Corp. more than five years ago and now operating in several major metropolitan areas throughout the country.

Not all types of transactions are good candidates for electronic markets. Products such as cars or mainframe computers, which are very difficult to describe, would not be good candidates. Neither would products that are uniquely tailored to customer specifications. Even with those exclusions, the range of appropriate products is very large, however, and will expand as computers become better able to manage complex descriptions.

Who is best positioned to create electronic markets? The answer is whatever company is best equipped to create the database for the market.

In some cases, electronic markets are preplanned. In others, they evolve out of other forms of electronic distribution channels. This sort of evolution can be seen in the case of the airline reservation systems, which started out as controlled distribution channels. These systems then became biased electronic markets (in which the computer screen first showed all of the prime carrier's flights) and finally evolved into unbiased markets as a result of pressure from regulatory agencies and the courts.

Both the Baxter Healthcare system and the McKesson system are now evolving from controlled distribution channels into electronic markets. Often, as is the case in those two instances, evolution is forced when other powerful firms begin to develop their own electronic distribution channels. Those that do manage the shift are, in effect, separating their businesses into two entities — an electronic market (in which they make money on transactions) and the traditional business. They do so in hopes of maintaining the advantage they had created through their original electronic distribution channel.

Who is best positioned to create electronic markets? The answer is whatever firm is best equipped to create the database for the market. In some cases, this will be a manufacturer; in others, a distributor. Or the opportunity may fall to an information systems provider. In all cases, it will be a company with a strong IS and communications infrastructure and an information systems management that is able to recognize and explain the opportunities to the top executives. ●

Benjamin is a Rochester, N.Y.-based consultant in strategic management of information technology. He is a visiting scientist at the MIT Sloan School where he participates in MIT's "Management in the 1990s" program.

In speed, there is strength

'Quick-response' teams can improve business reflexes

BY CHARLES P. SCHNEIDER

In a world where there are no secrets and where innovations are quickly imitated or become obsolete, blockbuster strategic moves rarely provide a lasting advantage. Today, precision, dexterity and speed are far more important. Achieving a lasting competitive edge requires superior tactics and excellence in execution.

What this means to information systems organizations, as they seek to become more integral to business success, is that they must be prepared to respond to an ever-changing world with unprecedented quickness and business insight.

From where are these fast reflexes and new insights going to come? One likely answer is from "quick response" teams — specialized units of experienced professionals within IS that possess both business and systems skills and are capable of operating in a fashion similar to that of a triage unit.

Dedicated teams

Just as traditional hospital methods do not work on a battlefield, traditional IS structures are insufficient for keeping up with the mounting pace of critical requests. What is needed is a dedicated unit with an approach and methodology for handling what seem to be countless cases, each one appearing to be more critical than the next. Creating such a team empowered to review requirements and determine the order and treatment of each request is the best way to ensure the greatest number of positive outcomes.

The size of such teams could vary depending on the company's size, the state of its current systems and the nature of the industry. On average, most would consist of three to 10 people. Larger teams would be subdivided into functional or line-of-business groups.

The team's role would be twofold. First, it would be involved in resolving key business issues and changes as they unfold, participating in key planning and problem-solving meetings. In addition, it would respond to ad hoc requests for new applications.

In fielding ad hoc requests, a quick response team would first determine whether the need is either already being addressed by a systems development effort or soon will be. If neither is the case, it would be up to the team to evaluate the business impact, risk and cost of the proposed project and determine whether it is something best pursued by IS, the business manager or a combination of the two. In any case, the team would select the appropriate tools to be used.

The existence of such a group offers several benefits:

- **Better alignment between business needs and systems development plans.** Since the team would be continually monitoring the business and making changes to the development plan as appropriate, it would be unlikely that the systems development plan could stray too far off track.

Resources would be strategically applied in a manner consistent with an overall plan and flexible enough to accommodate considered changes in direction.

- **Real-time involvement in business decision making.** Line managers would receive IS input on a regular basis, not just when solicited. Among other things, this means the operational and systems aspects of business decisions could be weighed before the fact.
- **Improved human resource control in the business units.** Head count throughout the entire organization could be better controlled because line managers, ensured of quick response to pressing systems development requests, would have less need to rely on hiring as the only means for handling work load increases. This last point is key because line managers have not viewed IS as a possible solution to their problems.

Until recently, IS strategies have tended toward two ends of the spectrum. Either they are totally user-driven and funded, or they are rigidly focused according to a prescribed plan that places nearly everything else on hold.

Neither will work effectively in the future. The user-driven approach is subject to fragmentation and escalating budgets and may not reflect key business objectives. The rigid approach ignores the need to adjust priorities based on business changes. The quick-response team concept allows for an appropriate balance, in that progress can be made toward an overall plan with an informed allowance for necessary deviations.

What is needed is a dedicated unit with an approach and methodology for handling what seem to be countless cases.

Of course, like IS plans, quick-response teams cannot and should not follow a rigid model. The extent and type of their activities may well vary, depending on the company, the condition of the underlying major business systems and the volatility of the industry in which the company competes.

At companies that are in the process of rebuilding core business systems, for example, quick-response teams would likely be involved in the study and development of new systems.

Once an organization reaches the point at which its operational needs are met, the team can move on to the job of enhancing operational data with other performance-type information and integrating information and systems across functional lines.

Quick-response teams can plug a number of existing gaps in the link between IS and business. In a nutshell, they provide insurance that the IS plan is solid and appropriate and that the company is using information and information systems as effectively as possible. Not incidentally, they also work to elevate the importance of IS as a key contributor to business success. ●

Schneider is executive vice-president and one of the founders of Management Dynamics in Tarrytown, N.Y., a management consultancy.

Practice what you preach

BY JEWELL G. WESTERMAN

The revolution that is changing the way work is performed in U.S. businesses will proceed at full speed through the next decade.

Under various banners — streamlining, downsizing, rightsizing — corporations will continue to trim their operations to give themselves a fighting chance in a more competitive marketplace. In any given year in the '90s, between 10% and 15% of all companies can be expected to have some form of a staff-reduction program under way.

Corporate restructuring will bring new opportunities and new challenges to information systems professionals. Within a few years, computer-aided design and manufacturing, computer-aided software engineering, computer-integrated manufacturing and electronic data interchange will have rendered traditional functional bureaucracies obsolete by enabling the real-time sharing of information throughout the production chain.

Organizational barrier

The major barrier to integrated operations is organizational, not technical. Companies are spending enormous sums in futile efforts to fit the new technologies into their obsolete functional organizations, with IS managers often bearing the blame. Organizational restructuring, if done properly, can remove the barriers to technological implementation. And, once companies begin to organize around their markets and customers rather than around traditional business functions, the result will be a more efficient, more responsive and more flexible organization.

IS staffs can be at the center of this revolution, providing the impetus for change. Becoming a central force for change means more than reforming business processes, though it also means reshaping old ways of doing business. If IS departments are failing to meet the needs and service expectations of users at a competitive price, they can look forward to enforced oblivion.

To keep their place in the streamlined organizations of the '90s, IS managers will have to apply the lessons learned in corporate restructuring to their own organizations. Four imperatives should guide this effort:

- Organize around the customer. To survive in the face of increasing competition from external providers, IS organizations will have to organize around their "markets," forming specialized units that will work with individual user groups in determining their IS needs and developing tailored solutions.
- Eliminate nonessential activities. IS managers, like CEOs, must analyze their organizations, determining what activities are being performed, their cost and their value to customers. Activities that do not add value must be eliminated, and overly costly activities must be restructured.
- Focus on service quality. The success of any staff group will hinge on how its value is perceived by internal customers.
- Coordinate all IS support. Corporate IS departments have not always had the best of relationships with the IS professionals in individual user groups. IS managers must take the initiative to open formal lines of communication between IS coordination.

Organizational restructuring, whether corporatewide or within a single group, is always challenging. However, too often, it is also debilitating. When based on inaccurate consensus, restructuring can leave an organization more fragmented and less efficient than it was to begin with.

On the other hand, successful restructuring can reinvigorate a company, creating a new sense of teamwork and a new commitment to customer service. Managers that lay the necessary analytical and interpersonal groundwork will find that a more streamlined organizational structure will not only make better use of the power of information systems, but improve communications and decision making, reduce costs and make for a faster, more flexible and more responsive organization — key success factors for the '90s. •

Westerman is a vice-president of Temple, Barker & Sloane, Inc., an international management consulting firm based in Lexington, Mass.

When El Paso had to change, so did IS

Regulated out of its old business, the natural gas company turned to IS to find new markets

BY KATE BULKLEY

Often, a company's adjustment to changes within its industry can be made easier by effective countermeasures in crucial areas such as organization structure and information systems. For example, at El Paso Natural Gas Co. in El Paso, Texas, IS initiatives are enabling the company to grow in a changing market.

In 1985, the Federal Energy Regulatory Commission changed natural gas industry regulations so that companies such as El Paso would have to change their business from buying and selling gas to transporting gas for third parties. The switch caused the company to take a one-time charge of $230 million last year as a reserve against potential liability for contracts with natural gas producers that they were compelled to renegotiate.

Faced with the need to cut costs and focus on new markets, El Paso appointed information systems executive Bob Evans as vice-president of IS *and* marketing.

"Technology is a way to mold the strategic direction of the company," Evans says, explaining his title. "We plan to sell software and incremental services like energy accounting to customers.

"In a pipeline business like ours, a methane molecule is a methane molecule," he adds. "So the only way to expand is to look at services that wrap around our transmission or pipeline so they will not only transport gas but also dispatch accounting statements as well."

In addition to new marketing strategies, El Paso has implemented new systems to cut costs, including computerized pipeline control systems and microprocessor-controlled compressor stations.

Since 1983, the company has cut staff by nearly 40% in its three major centers in El Paso, the Permian Basin area near Midland, Texas, and Farmington, N.M. These cuts were prompted both by federal deregulation and automation of many functions.

Likewise, since 1984 the staff within IS has been cut by one-third to 200 people, and operating costs for the IS unit are projected to be $16 million this year, down 33% from $24 million in 1984. The IS expenditure has hovered around $17 million to $18 million for the last three years.

In 1983 Evans spearheaded a decision to convert from a mainframe to minicomputers, and beginning in 1984, all software applications were rewritten.

"We don't have an application older than five years old," Evans says.

IS-based solutions have become much more important to the business as El Paso has changed to a transporter with multiple customers and producers.

For example, the company is planning to implement imaging technology. Today the company has 1,100 personal computers and 1,000 workstations, including 500 personal computers that can access the company's minicomputers.

The company has already targeted 20 to 25 applications for imaging technology, and its entire network should have imaging technology by the first quarter of 1990.

One example of the benefits Evans expects to garner from imaging is the ability to track the company's 10,000 gas contracts. "We'll keep the paper [gas] contract, but it's so much easier to put it on optical disc and push a button to pull it up," he says.

EDI help

The company also recently installed an electronic document interchange system for all users. It took four months of planning and cost about $300,000. The new system makes all the information the company compiles available to users both inside and outside the company.

In addition to reducing costs, EDI helps alleviate communication breakdowns between the company, its customers and business partners.

The next area of development for El Paso will be cross-functional computer systems, Evans says. "As you begin to take the time buffers out of processing information, the information flows immediately and you start creating a totally different dynamic in the organization," he says. "I think the next big issue is going to be how to accommodate the technology from an organizational standpoint.

"We've gone about as far as we can go by changing technology," he continues. "Now we have to rethink some of the organizational structures themselves. Business processes will transcend the organizational processes, and although it's subtle, I'm not talking about turning the organization upside down. We have to rethink how business processes overlay finance, accounting, marketing and so on. There are ways to layer in new systems."

El Paso's IS staff is gaining new skills to deal with business issues.

"We used to be a real high-tech shop," Evans says. "Most of our IS was supporting technicians. Now, I spend more money training the staff about the business than I do about IS." •

Bulkley is a free-lance writer based in Denver, Colo.

TIMOTHY FULLER

Evans *is vice-president of IS and marketing, a combined title that signifies company direction*

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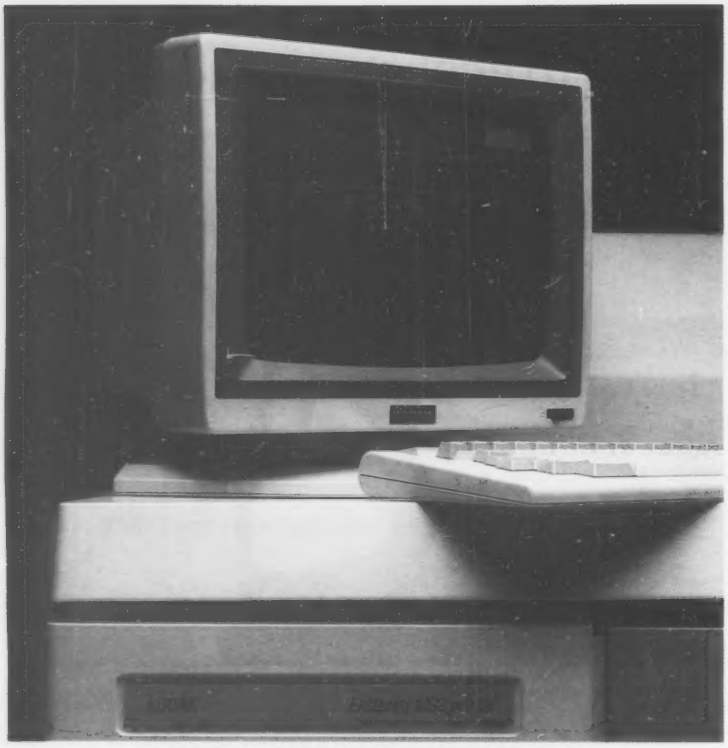

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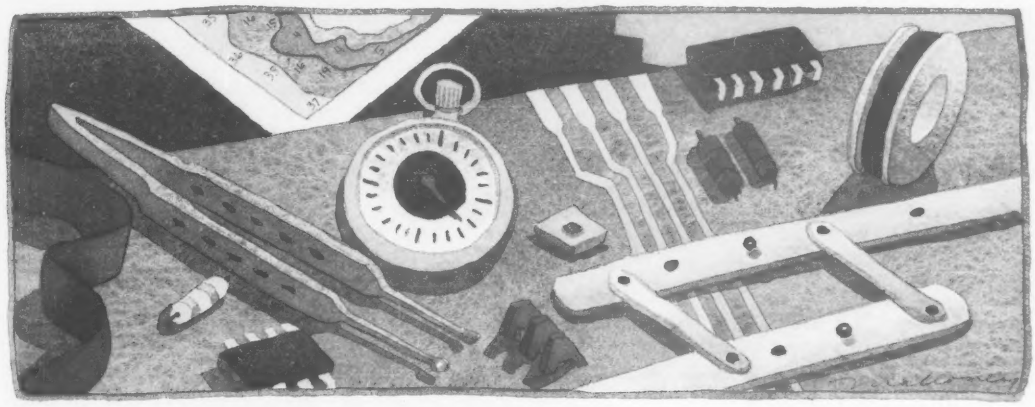

Navigational Aids

WHEN THE GOING gets tough in the next decade, information systems managers will at least have a wide assortment of powerful tools at their disposal to drive their organizations into the future. In fact, the hard part will not be finding technology but recognizing the most appropriate match for a company's needs amid the clutter of possibilities. A willingness to experiment will be absolutely crucial. Pioneering companies that have gotten an early start channeling today's emerging technologies into primary business areas will find themselves far ahead of the pack.

Experimentation beats guesswork

BY PAUL SAFFO

If you liked the computing chaos of the last decade, then you will love the 1990s. Change has long been the dominant constant in the computing world, and the next few years will be no exception.

But the '90s will be different in one very important respect. A decade ago, personal computers filled a business computing vacuum. The innovations in the next decade must coexist with or conquer a large installed base of computing power — and users with very definite ideas about how they use computers in their work. I suspect that this is one reason why the long-awaited "workstation revolution" has yet to arrive in the office — it has run aground on a reef of DOS-based PCs.

This amalgam of old and new is not likely to stall advances in business computing, but it is certain to make computing trends less predictable than ever. Even under the best of circumstances, forecasting is a dismal science. New ideas take forever to catch on, but when they do, everything tends to happen at once. Take hypertext, for example. Ted Nelson coined the term in 1965, but it languished in virtual obscurity until Apple's introduction of Hypercard in 1987. Suddenly, hypertext was everywhere.

It turns out that nearly everything in the computer field — from artificial intelligence to Unix, graphical interfaces and even the microprocessor itself — tends to follow this pattern. Sometimes it seems that everything takes 20 years to become an overnight success. Most forecasts are not merely wrong, but twice-wrong because this pattern tricks us into macromyopia, a peculiar form of forecasting double vision. We consistently overestimate the short-term impacts of an anticipated change, and then when it doesn't arrive on schedule, we underestimate its long-term implications. Every family was going to purchase a personal computer, and when they didn't, manufacturers concluded there was no home market at all — until Nintendo became the hit of the last Christmas season.

On the bright side, the time it takes for new ideas to take hold makes it easy to spot at least some of the issues we will face in the 1990s. Most of the questions bedeviling us today will be around through much of the next decade. Will Unix catch on? Will OS/2 succeed? Will we ever use computers for something other than word processing and spreadsheets? Will information services be used by more than a specialized few? Can groupware deliver real benefits? Do PCs really increase productivity? I am willing to bet that more than a few of these questions will be on our minds in the fall of 1999.

Unpuzzling the puzzle

Pieces of the technology puzzle are also comparatively easy to forecast. Moore's Law, which states that the density of circuits on silicon doubles every 18 months, has been pretty much on the money since it was first articulated by Intel Corp. cofounder Gordon Moore in the early 1970s.

There are signs that the trend may flatten somewhat, but today's million-transistor chips are likely to be dwarfed by progeny that can handle 100 million transistors well before the next decade is out.

Similar advances are in the wind for both storage and communications. It is only slightly more hazardous to guess at the sort of machines that may emerge from these advances. Keyboardless laptops that recognize handwriting and dramatically more powerful workstations are just two near certainties.

So why is change so perverse? Even clear technological hits generally come to pass in very unexpected ways. Low-cost laserwriters sold as well as their makers hoped, but no one guessed that it would be because of desktop publishing. I suspect that this is so because technology does not drive change at all; it merely enables change. It creates new options and opportunities for us to discover and exploit. Change is so unpredictable because it takes time and many false starts for us to make collective sense out of any new technology.

The unpredictability inherent in this technological give-and-

Saffo is a Research Fellow at the Institute for the Future in Menlo Park, Calif.

take makes the crystal ball turn dark just when things get interesting. More often than not, the trends and innovations we do foresee obscure more important surprises.

The hot issue in the late 1970s, for instance, was finding ways to move minicomputers into businesses. Personal computers were dismissed as hobbyists' toys, and analysts agreed that user acceptance would be slow until the power of the new devices was sufficient to run minicomputer software.

The analysts were half right — and eventually, utterly wrong. Software was important, but it wasn't minicomputer software. The introduction of Visicalc demonstrated that personal computers were not minicomputer substitutes but an entirely new class of tool.

What conceptual traps have we laid for ourselves in the decade ahead? Our PC-fostered microprocessor arrogance could be blinding us to the possibility that workstations will make sense as general-purpose tools within a larger computational and communications ecology.

Right now, workstations satisfy our desire for ever-increasing power on the desktop, but that power seems to have limited value outside of specialized MIPS-hungry applications. I'll bet, however, that there's a workstation equivalent of Visicalc lurking around some future turn — a tool that will connect workstations with a variety of remote devices to perform some important but overlooked business task that we still manually perform today.

How can change-beleaguered users minimize the surprises ahead? Alan Kay once observed that the best way to predict the future was to invent it. In a technology-enabled world, it is the users who do the inventing. Success will come from a willingness to explore, experiment and, above all, expect some failures as part of the process of getting value from our new business tools.

We tend to keep our equipment long after it has become obsolete — just think of how many Intel Corp. 80286-based machines sit on office desktops today. It still makes sense to use the heck out of any device that clearly delivers value, but I believe that success also lies in viewing our expensive new machines as disposable technology.

The unpredictability inherent in this technological give-and-take makes the crystal ball turn dark just when things get interesting.

Adopt early, experiment aggressively and don't be afraid to toss the duds into the dumpster.

A second success factor is a willingness to reorganize business structures to take advantage of new information technologies. It turns out that this is what we have done for the last few hundred years.

Medieval times

The great medieval financial houses were shaped by the printing press and double-entry bookkeeping. Modern corporate structures got their start following the arrival of a reliable postal service and the telegraph.

Economist Peter Drucker suspects that our new computer tools are similarly changing businesses today. If he is right, the information-based organization of the '90s may be composed of semiautonomous high-performance teams coordinated by a small management cadre. The first organizations to exploit these new opportunities could become the de' Medicis, or the General Motors of a decade hence.

Above all, success will come from taking a long view of the changes ahead. The best cure for macromyopia is a strong sense of history and a flexible vision of the future.

No matter how crazy the 1990s get, this perspective will go a long way toward ensuring that we don't mistake a clear view for a short distance — or a straight line. ●

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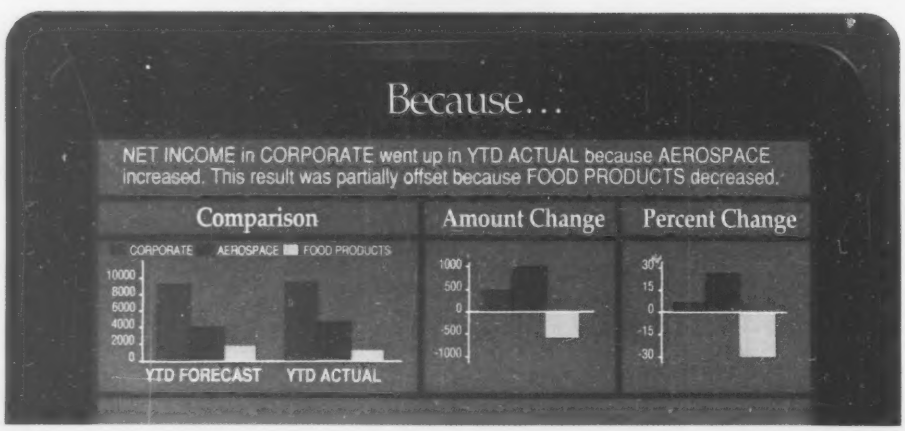
* "Decision Support and Executive Information Systems: Markets and Trends," International Data Corporation, November 1988.



New tools for changing times

In the next decade, technology will bring about easier and more effective meetings, flatter organizations, national multimedia networks and manufacturing innovations

Systems for executives

BY HUGH J. WATSON

October 9, 1994, has been a difficult day for Ben Harris, the CEO at Omega Corp. Beta Corp. has announced a product with capabilities and a price that is likely to affect Omega's market share significantly. Rumors about it had been entered in the diary of Omega's executive information system (EIS).

Earlier in the day, Harris used the system's voice mail to call a meeting in his office. He begins the meeting by saying, "I've asked Linda Williams from marketing to cover the possible ramifications of today's event." All heads turn to the large, thin display screen on the wall, as Williams begins to use the system's decision support capabilities to show the impact the product will have on Omega's competitive position.

Someone asks, "Bill, what's the timetable for rolling out our new product?" Picking up a remote control device, Bill Davis, head of product development, calls up information that relates to the product. A voice description and an artist's rendering of the product are accessed from an optical disc.

Harris asks Williams to simulate the possible effects of combining a price reduction on the existing product with a new marketing campaign. Williams' analysis shows that this response would hold market share until Omega's new product is ready. Harris asks Williams to develop a marketing plan within a week. She indicates that she will use the groupware capabilities of the EIS to get as much input for the plan as possible.

.....

The EIS technology and capabilities described above are either already available or soon will be. As the technology gains in both capabilities and use, it will affect organizations in a variety of ways: EIS systems will supply executives with much of the information needed to support strategic decision making; they will facilitate organizational downsizing by assuming many of the information-collecting, filtering and processing responsibilities of middle managers and staff; and they will allow geographically dispersed organizations to communicate more effectively.

EIS will also affect organizational processes. For example, there will be less need for meetings because information can be obtained and communicated electronically. When there are meetings, people will be better prepared because they will be able to review information in advance. Meetings will be held in rooms that support the use of EIS and other computer and audiovisual technologies, allowing them to be shorter and more effective.

Finally, EIS will be one of the major technological advances that will spur much-needed structural reforms in the next decade. Managerial work will be synchronized with the technology. •

Watson is a professor of business administration and director of the MIS program at the University of Georgia, in Athens, Georgia.

Broadband networks

BY SANFORD BINGHAM

DAVID FLAHERTY

The amount of switched bandwidth available to large companies has begun an exponential rise. Transmission speeds of 100M bit/sec., available now in local-area network environments with the Fiber Distributed Data Interface protocol, will be generally available in public networks by the mid-1990s. As this happens, corporate networks will be able to maximize the use of all types of information.

Today, these services are emerging in the form of metropolitan-area networks (MAN). MANs are designed primarily for LAN interconnection but will also be capable of carrying the type of integrated video and data signals that are needed for Computer Supported Collaborative Work (CSCW).

A preliminary CSCW network is currently being developed at AT&T Bell Laboratories. Called the Rapport Video Groupware Project, the system not only integrates telephony, facsimile and still video onto a single workstation screen, it also allows the sharing of computational power between users. The crucial element of the Rapport system is a new piece of software that allows users to share each other's applications without giving access to their source code.

Initial MAN trials by divested Bell operating companies and others transmit at 45M bit/sec., but the technology on which they are being built is capable of transmission at 145M bit/sec. Transmission at these speeds allows basic collaborative work applications and full-motion "desktop videoconferencing" — something now under development at Bellcore.

Bellcore has developed an enhanced CSCW network called the Integrated Media Architecture Laboratory (IMAL), which delivers voice, data, images and up to six simultaneous video inputs with high-fidelity audio to the desktop. IMAL gives its users control of the amount of bandwidth used and thus the ability to add video, audio, image or annotation inputs at will.

IMAL will fulfill the promise held out by videoconferencing networks without requiring specially equipped conferencing rooms.

CSCW and IMAL are prototypes of what corporate LANs will be able to do in the 1990s. Using such networks, corporations will be able to set up systems where videoconferencing and messaging become a built-in resource to workstations in much the way that LAN or remote mainframe access is today. Connecting these advanced local systems to the high-bandwidth fiber-optic-based public network will propel the evolution of national systems for integrated multimedia exchange. •

Bingham is editor of "The Bit," a bimonthly journal of new communications media.

Manufacturing AI

BY RICHARD J. MAYER

What artificial intelligence will bring to manufacturing in the 1990s will not be the "lights-out" environment envisioned during the late '70s and early '80s but, instead, a more exciting workplace.

Some have predicted that the spread of low-end AI shells and user-created applications spells the end of midrange and high-end applications in manufacturing. In fact, just the opposite appears to be the case. Demand is actually rising for higher-level applications, particularly those developed and delivered on coprocessor embeds.

Information resource analysis and planning as well as integrated IS design are major pursuits at most engineering and manufacturing companies today. Consequently, we are beginning to see a movement of AI research results into the upper computer-aided software engineering Information Systems Engineering domain (AI-CASE).

There is, for example, a trend toward customizing knowledge acquisition and knowledge engineering methods for use in enterprise modeling and system analysis. We are also beginning to see upper CASE support tools that can automatically produce models and plans, based on input from engineering and manufacturing experts.

The next five years will also see extensive use of knowledge-based engineering performance model development systems. The systems will both assist in the formulation of new models and capture the assumptions behind existing models, thus permitting their reuse.

More large corporations are likely to deploy specification generation systems, which use knowledge bases that integrate technical, cost and contractual knowledge.

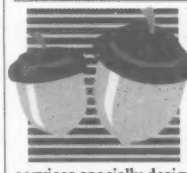
Competitive pressures, more stringent interpretations of product liability and better informed consumers are all pushing manufacturers to produce better performing products at a lower cost. Achieving this dual objective requires more and better design analyses. Today, these are largely costly and time-consuming off-line manual reviews and redesign cycles. Before long, progress made in methods for the representation of sharp, form and feature-based knowledge as well as geometry reasoners, will permit the development of expert systems capable of design analyses.

The AI components of this technology will emerge during the next five years and begin to see widespread application before the end of the decade. These new capabilities will also permit a resurgence of the use of group technology for design analysis, cost estimation, manufacturing planning and scheduling. •

Mayer is director of the Knowledge-Based Systems Lab at Texas A&M University.

A step beyond EDI

BY DAVID TAYLOR



By the year 2000, electronic data interchange (EDI) as we know it will have almost ceased to exist. Today's stand-alone systems and special-purpose translation products will give way to a generation of applications, databases and network services specially designed to handle the interenterprise movement and management of all types of information, including the structured business data that we now call EDI.

This change will happen in stages, and one of the first will be to expand EDI systems from handling only structured documents to semistructured documents without human intervention.

As EDI graphics generation, image processing and electronic funds transfer become accessible to every user, the need to move complex (or compound) documents between enterprises will force users to migrate from EDI-only systems to interenterprise systems capable of handling all types of information.

The need to improve responsiveness to market changes and customer demands will cause the continued decomposition of large corporate entities. These will become more fluid and modular "virtual enterprises," with shifting groups of alliance partners contributing engineering, manufacturing and distribution capabilities as they are needed.

The rise of the virtual enterprise will precipitate the restructuring of industries toward greater horizontal and vertical integration while creating new roles for intermediaries. In some cases, EDI will let companies completely bypass distributors, brokers and wholesalers. In other cases, these middlemen will take on powerful new roles as "information servers," offering their own network services and distributed database applications.

This vision of what will grow out of EDI's current limited form poses major challenges for IS professionals. The transition from EDI to support of interenterprise collaboration will overtake us before we are ready, unless planning starts now. •

Taylor is director of interenterprise systems at Gartner Group, Inc.

Distributed relational nightmares

BY PETER G. W. KEEN

As if we didn't have enough to worry about in the next decade with the greenhouse effect, now there is the specter of distributed relational database management systems to keep us up at night.

Is this the end of the information systems field as we know it? Is this the development that will plunge us back into confusion, just when we thought we had reduced everything to a personal computer plus a local-area network plus SQL and only needed to wait for Open Systems Everything? It almost certainly is.

Distributed RDBMSs are the natural organizational evolution of just about every trend in the application of information technology. In many ways, they have little to do with distributed data and are more related to distributed work, distributed customers, distributed organizations, massive self-managing networks and cross-organization business operations.

Distributed RDBMSs and the necessary telecommunications capabilities will become the effective electronic organization structure in companies whose shape will inevitably be less hierarchical than now, spanning time zones and companies through electronic linkages. Comparing what we are seeing today in point-of-sale, electronic data interchange and computer-integrated manufacturing with what will be available in 1999 is like comparing Visicalc with the latest release of 1-2-3.

On-line intracompany and intercompany linkages are the business drivers for distributed RDBMSs. The organizational drivers are globalization and the development of the "relational organization." In a relational organization, the business team is the basic unit of organizational design, and team technologies, ranging from groupware to videoconferencing, serve as the base for collaborative work across locations.

In the context of global and relational organizations, the coordination of massive distributed information resources across massive telecommunications networks will be a major technical, managerial and organizational challenge.

This goes well beyond SQL and intelligent workstations accessing remote data stores. The big worry is that those in the information technology field — vendors, practitioners, academics and consultants — are woefully narrow-sighted here, particularly about telecommunications and what happens in a large-scale, on-line network.

Take the consequences

The PC-based perspective, which is the one everyone has been leaning toward on distributed RDBMSs, mainly focuses on distributed reads via standard networks and LANs. It is usually oblivious to some obvious and fairly immediate consequences of the shift to distributed business, including the following:

- An immensity of new telecommunications demands in terms of automated network management capabilities, massive bandwith requirements for interapplication communications and the operating environment complexity introduced by true cooperative processing.
- The prospect that old data management disciplines will limit future applications as painfully and expensively as the spaghetti Cobol-based transaction systems built in the 1970s now constrain and bedevil those who try to build new ones.
- The fact that the complexity of fully distributed RDBMSs involves a level of vendor investment equal to or greater than that needed to move IBM's Systems Network Architicture, Open Systems Interconnect and Systems Application Architecture from definition to cost-efficient reality.

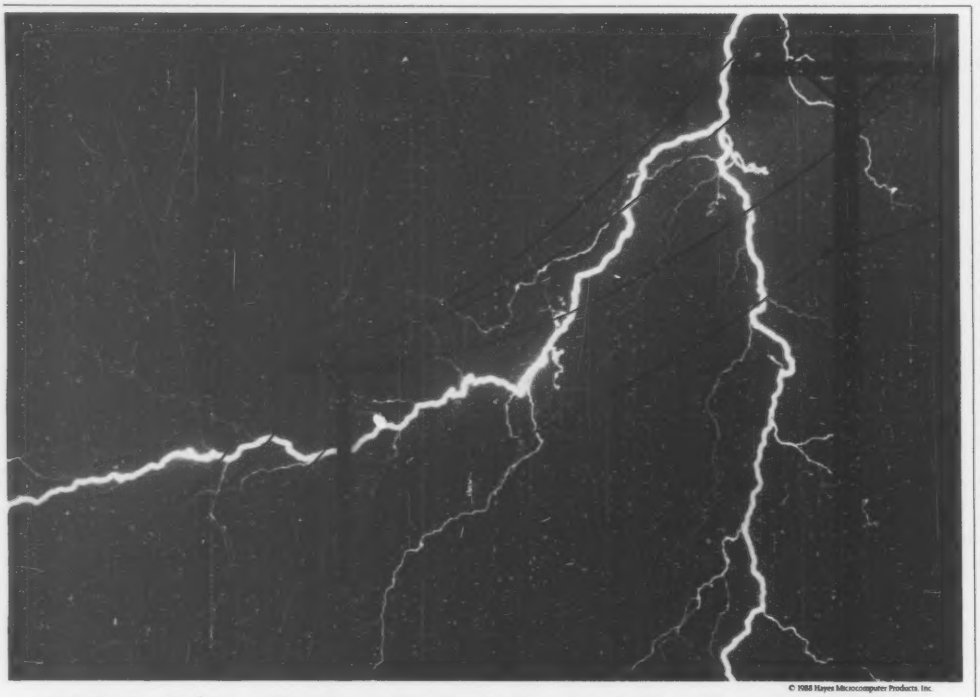
The explosion of telecommunications demands means that, before long, user-managed networks will be like user-managed storage — a quaint memory. Simply consider the large U.S. organization that has a telecommunications network with three million devices on it, ranging from burglar alarms to workstations to switches to processors. An active network experiences 5,000 state changes per hour, which amounts to a per-hour operator reading load equivalent to the full text of *Hamlet*.

In that kind of context, automated network management is not a simple add-on issue; it is the heart of the network. Such networks will be typical in the early '90s.

However, it isn't technology that we really have to worry about. The real danger is that we may be blinded by all the blue sky promises around us, making the leap to this new business world a difficult one.

Have you, for instance, heard the one about the new genre of database server packages that is changing the rules of the game and offering companies an opportunity to move complex applications from expensive minis to affordable LANs? That's dumb and scary. There is no quick fix and no plug-and-go solution. Getting the benefits of the relational organization will be hard work. •

Keen is author of the book *Competing in Time* and executive director at the International Center for Information Technologies in Washington, D.C.



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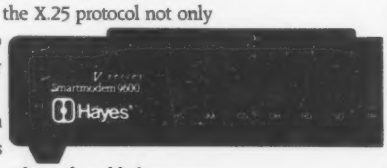

V-series modems still provide users with data compression that can double throughput. And Hayes AutoSync for built-in synchronous communications without the added expense of a synchronous adapter card.

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*There will be a minimal charge of $50 for either an X.25 or V.42 upgrade on products purchased before October 1, 1988. Products purchased on or after October 1, 1988 will include either standard as they become available. For details call Hayes Customer Service: 404-441-1617.

The Crew

IT WILL TAKE particularly skillful hands to throttle up the kinds of information systems that businesses will need in the next few years. The trouble is that demographics won't cooperate. Warning signals are up for general shortages in coming seasons. Will there be enough people with that elusive combination of business and technical skills to go around? In part, the answer depends on how willing and able the present generation is to adapt to changing requirements. It can be done, but will they do it?

Fewer hands on deck

BY MITCH BETTS

The strategic information systems (and even the ordinary information systems) of the 1990s are not going to grow on trees. It takes talented people to make them happen.

But the demographic trends of the 1990s are conspiring to produce a shortage of computer science graduates. Consequently, experts say IS executives will soon be scrambling to do the kinds of things that people do when faced with a shortage: steal (employees, that is), pay top dollar to keep what they have and develop an alternative supply.

The problem is that it was not very fashionable to have babies between 1965 and 1978, what demographers call the "birth dearth." A weighty pile of government and academic studies such as the Hudson Institute's landmark "Workforce 2000" study have painted a stark picture of the U.S. labor market in the 1990s. Some of their grim conclusions include the following:

- We are facing an acute shortage of entry-level workers that is likely to persist until about 2005. The U.S. work force will be growing more slowly than at any other time since the Great Depression, and there will be a sharp drop in the number of young workers (age 16 to 24), especially in the Midwest and Northeast, as a result of the birth dearth. Three-quarters of those who will be working in the year 2000 are already in the work force.
- Those who are already working will probably confront some career frustrations. The aging of the baby-boom generation is creating a generally older U.S. work force and a glut of middle-level managers.

"The people who comprise the baby-boom generation are just crawling all over each other for jobs on the upward-mobility ladder that just aren't there," says futurist Joseph F. Coates of Washington, D.C.

- New entrants to the U.S. work force will be mostly women, minorities and immigrants. White males have historically filled most technical jobs, but they will constitute only 45% of the work force by 2000.
- Businesses are worried that those new entrants lack adequate education and skills such as reading, writing, problem-solving and computer literacy to handle the increasingly sophisticated jobs of the future.

Consequently, IS executives in the 1990s will have to cope not only with radical changes in the whole IS function — including downsizing, outsourcing and decentralization — but also with a labor market turned upside down.

"IS executives are currently having a hard time getting, and holding on to, highly skilled technical people. Since college enrollments in these technical areas are declining, it's certainly shaping up as a problem that will only get worse," says Anthony DiRomualdo, associate research director at The Diebold Group, Inc., a consulting firm in New York.

According to a frequently quoted study by the University of California at Los Angeles, the number of college freshmen planning computer careers dropped from 8.8% in 1982 to 2.2% in 1987.

Although the traditional IS labor supply is declining, the demand side continues to rise. For example, the U.S. Bureau of Labor Statistics estimates that the demand for computer systems analysts will increase a whopping 76%, which amounts to 251,000 new positions by the year 2000. Similarly, the demand for programmers is expected to grow 70%, a gain of 335,000 jobs. In both cases, the demand is about equally split between the computer industry

Betts is *Computerworld's* Washington, D.C., correspondent.

Fewer hands

FROM PAGE 29

and IS organizations.

"Despite more effective programming tools, [user] demand for software is expected to spur the growth because of the ever-expanding range of new applications for computers," the labor bureau reasons in a report called "Projections 2000."

However, these categories are not the only ones in which a serious gap is opening between supply and demand. Already, technical recruiters and IS managers say there is a shortage of people with hot technical skills such as network management and database administration.

To further complicate matters, the IS organization is beginning to require a different set of skills that stress business savvy as much as technical prowess. "We're seeing an increase in demand for a crazy kind of generalist position — a person who has had some multivendor [systems integration] experience and some micro-to-mainframe experience and who understands how to talk bottom-line business with department managers," says Rick Keane, vice-president of business development at Dunhill Personnel Systems, Inc., a recruitment firm based in Long Island.

The good news

This picture of an IS labor shortage is pretty alarming, but some experts stress that a casual look at demographics data is too simplistic and that there are countervailing trends that will make the shortage less severe.

For one thing, the labor market has regional and even industry-specific variations. The East and West Coasts are now experiencing shortages of IS employees, but the Rocky Mountain states have a surplus, says Robert Zawacki, professor of management and organizational behavior at the University of Colorado in Colorado Springs.

The ranks of prospective employees will be thinnest in the lower echelons of the work force, but several forms of automation are making it less likely that IS will need low-level workers. Also, some firms are shipping their data-entry jobs to offshore locations.

"I see a definite decrease in the need for what some might call blue-collar work in this business, whether it's a computer operator hanging a reel of tape or a data-entry clerk," says Les Gilliam, an IS management consultant in Ponca City, Okla.

In addition, the drop in computer science graduates may not be such a problem for the new breed of IS organizations. Gilliam argues that as the IS function is dispersed to various departmental units in the business, many IS tasks will be handled by business-school graduates who have some technical training.

IS organizations will not only outsource to U.S. contractors but also to foreign countries with a surplus of IS talent, Zawacki notes.

Zawacki predicts that IS organizations will use a variety of other tactics to deal with workforce contraction, including bringing back retirees as consultants, delaying retirements, reducing turnover, permitting job sharing and recruiting from foreign countries.

"The shortage may not be as severe as everyone is screaming, because we've got additional sources" of IS labor, Zawacki concludes. "What I do see happening is more turbulence, more flux and more stealing from each other."

All experts agree that the competition among IS organizations, contractors and vendors will be intense, and that these firms are likely to focus as much on workplace amenities and child-care policies as on compensation.

Employers need to remember that the white-collar work force of the 1990s will be full of two-income households that have a lot of clout when dealing with employers in a scarce labor market, Coates says.

"These two-income households are going to twist the tails of companies to get the kind of workplace situations they want," he adds. •

At Kingsbury, everyone's computer-fluent

When the machine manufacturer switched product lines, the whole staff got computers

BY DAVID GABEL

Global competition can alter the very nature of an industry or market. To counter the strategies of international firms, U.S. companies often must consider drastic changes in the way they do business. Few companies have changed as completely or as quickly as Kingsbury Machine Tool Co. in Keene, N.H.

To maintain its market share in the face of sophisticated competition from the Far East, Kingsbury converted its mechanical skills in building dedicated equipment and started using computers to build flexible machines controlled by software.

Before 1980, the company sold nothing but machine tools — ones that made particular parts such as a fuel-pump actuating levers — to the automotive industry. Now, as a result of its new business strategy, Kingsbury has a line of computer-controlled metal-cutting machines that can be reprogrammed to make a different part in a matter of hours. It also has a line of computer-controlled assembly tools that can make such assemblies as fuel pumps and alternators.

Has the change paid off? "Definitely," says Jim Koontz, the company's president. "We are still in business in the face of real increased competition, and we have been profitable continuously since 1933. Our people are trained to operate with computers and to produce computer-based products. A healthy percentage of our business — about 90% last year — is computer-controlled machinery. And we are positioned for the future.

"The products are becoming computer-controlled," Koontz adds, "because our customers need the flexibility. Consider, for example, that there are 35 major auto manufacturers, all going after the same market that three served a short while ago. So, lot sizes in the auto industry are smaller than they used to be, which means you need more flexible machines, and that means computer control."

"The machine-tool industry has been troubled of late," he continues, "and some companies have dropped out. To survive, you have to outproduce your competitors on cost, project a quality image and deliver in a timely manner. That means integrating computers into all phases of the business."

PAUL AVIS

Spring and Koontz *say computer exposure improved attitudes*

Kingsbury's switch in product line was accomplished with the help of an innovative shift in skills training.

"We didn't have more than a handful of people who could work with a computer," Koontz says. "But we knew the product line had to change, and we had to have our people computer-literate. So we thought we would make everyone computer-literate.

The company tackled its computer-literacy four ways:

- Every person — from the janitor to the vice-president — who said they would like to use a computer at work was given one, no questions asked.
- Kingsbury offered employees a purchase plan to get their own computers with no-interest loans paid back with payroll deductions.
- Management hired programmers for developing computer-controlled tools.
- The company began a user training program through its IS organizations.

Much of the training for the engineering and design staffs came from equipment vendors. But there was training for other employees as well, and it was here that IS had a part to play. According to Dave Spring, manager of information systems, "We taught people what a word processor was and what a spreadsheet was."

Kingsbury currently uses Lotus Development Corp.'s 1-2-3 for spreadsheet applications and Wordstar International's Professional and Wordstar 2000 for its word-processing needs.

Products were not the only things that had to change to make Kingsbury more competitive. The company also realized it needed a new philosophy.

By educating the entire workforce in the use of computers, the company was able to breathe life into the concept of employee involvement. "Everyone in the company now suggests changes to make things better," Koontz says. "They can all operate our machinery. And they can go out and service the equipment in the field, because they're comfortable with it."

There has been a benefit for IS as well. "I've been in the mainframe world for 20 years," Spring says. "And I got awful tired of hearing, 'It's the computer's fault.' Now, with everyone up to speed with computers, I hear, 'How can I do more? What can this computer do for me? Teach me how to do it, or else give me a more powerful machine.' The people are out there striving for more knowledge. I have to work hard to provide that, but it also makes my job easier." •

Gabel is a free-lance writer based in Northport, N.Y.

Paying top dollar

Compensation is already rising sharply for some of the key IS jobs that are expected to see shortages in the 1990s

Position	Percent increase in total compensation, 1988-1989
Top IS executive	17.6%
Group head, computer services	27.2%
Systems software manager	20.4%
Head, telecommunications services	27%
Head, systems planning and architecture	32%
Manager, international network planning	26.2%
Database manager	12%
Telecommunications network specialist	23%
Entry-level programmer	10.5%

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INTERVIEW

Broader career track ahead

Larger skills sets will be needed to meet the coming challenge

Donna B. McNamara is director of human resources in the Corporate Technology Group at Colgate-Palmolive Co., as well as the president of the American Society for Training and Development. She recently spoke with *Computerworld* features editor, Joanne Kelleher.

What are some of the major challenges information systems managers will face during the next decade, in terms of labor supply?

One challenge is that the amount of skill and competence required of those coming into IS is increasing at a time when the proportion of folks going beyond high school is diminishing. Even more important than that, however, is the need to create a new role model for IS. Different kinds of skills are going to be needed to get IS to the next stage of contribution to the corporation.

What kinds of skill requirements are you anticipating?

IS personnel will have to develop a strategic, rather than just a tactical, orientation. They'll need to cultivate a global perspective and become team players, as opposed to technically isolated specialists. They must also develop an understanding of how information systems affect people and the way they work.

How can an IS organization go about developing these skills?

There will have to be considerably more training made available in organizational design and effectiveness and in people-oriented skills.

Beyond sending staff to training courses, are there other actions that IS managers can take?

They can make sure that their people are spending time in sales offices, on the plant floor and in client meetings. It is important to give IS professionals a chance to experience things from the line side.

What about drawing resources directly from the business departments?

That can work very well, particularly if the IS department uses a team approach. As you build a team, there may be different people that have varying strengths, and it certainly provides opportunities to migrate people in from the business units.

This isn't something that should only work in one direction, though. Just as there are business people who have an aptitude for technology, there are IS people who have a good business sense. This type of individual can bring a lot to the business organization.

ANDY FREEBERG

Given what you've said, do you expect that IS will continue as a separate career track?

Yes, I think it will continue as a career track. But I hope it is a broadening one, with many possibilities for variation and growth. There should also be an increase in the number of people for whom IS is a point in a career that eventually takes them into general management.

Can you tell me what you meant when you said IS professionals will need to have a global perspective?

That might seem like an extreme statement, but the underlying premise is that the world is becoming increasingly unified. Global competition is heating up. Companies are dealing with new kinds of suppliers and expanding into new markets. Those factors are affecting companies of all types — big and small, multinationals and single-site companies, and IS needs to understand them in order to be effective.

Effective in what sense?

I believe that there is tremendous opportunity for people in IS to be in a leadership role; a selling and influencing role. It may be that part of their job will be to influence the top executive of the corporation to become more aware of the global issues. •

Wish lists: Visions of ideal IS staffers

From: Michael Thorsen
Director of MIS
Datacard Corp.
Minneapolis, Minn.

Experience: A generalist, liberal arts background is key, especially because we deal in international markets. We welcome "knowledge workers" from other function areas of the corporation with two to five years of experience.

Skills/strengths: Communication skills are critical. In analysts, we look for the ability to conceptualize ideas and relate them to the business as a whole.

Desired personality traits: We want an aggressive worker with a healthy curiosity about the business as a whole, not just the technical aspects of it.

Educational background: Programming analysts need a minimum of five years of experience. We want someone with both a liberal arts and strong technical background.

Style of management and rewards: We're trying to give people the freedom to work within set goals. Our final goal is to maintain the soft skills of employees and make the process of career development smoother and more natural.

Compiled by *Computerworld* assistant researcher Jody Naze.

From: Richard Shelgren
Vice-president of MIS
Trailer Train Co.
Chicago, Ill.

Experience: We look for computer science graduates to fill systems development positions. We are happy to get entry-level people from the colleges, but academia must be able to keep up with the needs as far as technology is concerned. For senior-level positions, we tend to look more for business experience such as finance.

Skills/strengths: Good communication skills, both written and oral, are a must. So are good organizational skills. We need visionaries; we can't afford to have people with tunnel vision.

Desired personality traits: We look for flexibility, the ability to get along with others, an aggressive attitude, good listening skills, technical skills, a sense of logic and a stick-to-it attitude.

Educational background: Education beyond the undergraduate level.

Style of management and rewards: The company will have to do whatever it takes in order to keep these people. We will consider many options, including contractors and temporary help.

From: Irwin F. Bernstein
Vice-president of planning and administration
Maidenform, Inc.
Bayonne, N.J.

Experience: There has been a separation between programming and systems analyst types of positions, but now there is a new class of people in the making. These are the business analysts, and we're looking for them. They are generalists/analysts who use the computer just as a tool.

Skills/strengths: Communication skills are important. The business analyst I speak of must be able to present ideas clearly.

Desired personality traits: We need to see a combination of stable traits, coupled with loyalty and individual responsibility to the company.

Educational background: A college background in business areas is probably the most important asset for positions that associate with users.

Style of management and rewards: I try to emphasize individual responsibilities and self-management. I like to tell people what's going on, hoping this will initiate a motivational thinking process.

From: Jim Goughenour
Vice-president of customer service
The Hon Co.
Muscatine, Iowa

Experience: There is going to be an increase in knowledge workers and more people will be involved in the design of the product. With this in mind, we look for a general background. Experience will vary. Team leaders will need more experience with people-oriented situations.

Skills/strengths: The ability to use CASE tools to design in fourth- and fifth-generation languages should go along with the general background.

Desired personality traits: Flexibility is key. Departmental lines will become less rigid, and in turn, we need less rigid personalities who will participate in ad hoc teams.

Educational background: The general background we look for is a mix: a basic liberal arts program and training in business skills.

Style of management and rewards: If I had my druthers, I would use a weighted system. For excellent performance, I would like to pay excellent money. Influencing, persuading, counseling and coaching will become the tools of the managers of the '90s.

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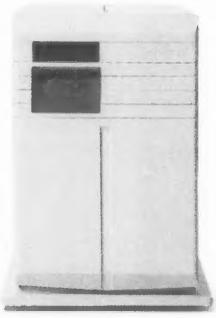
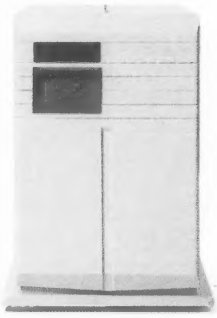
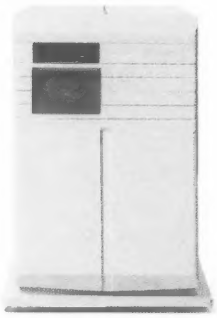


Regional/Branch Banking Systems



International Banking



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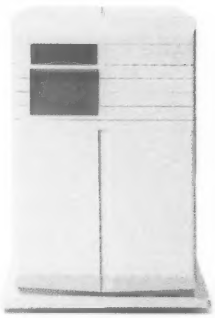

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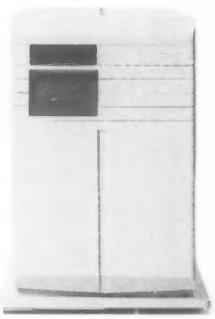

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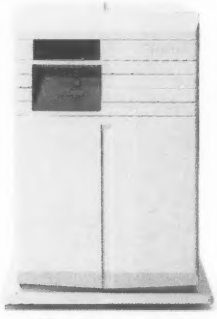

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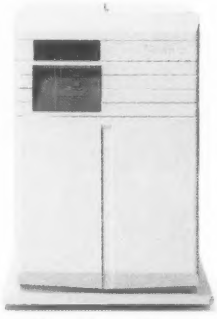

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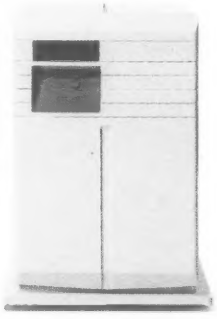

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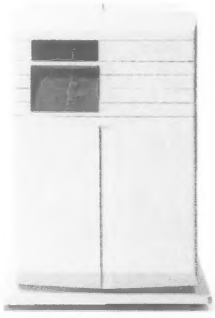
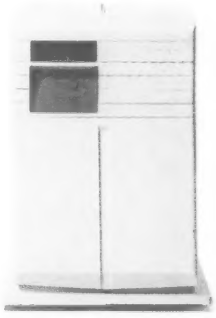


Telemarketing



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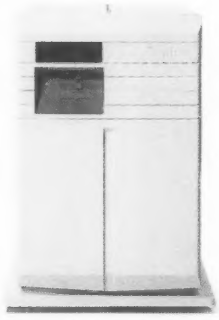
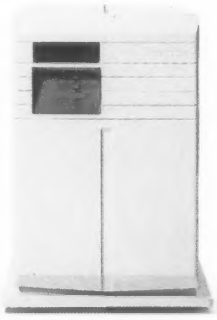
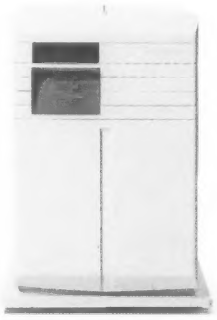


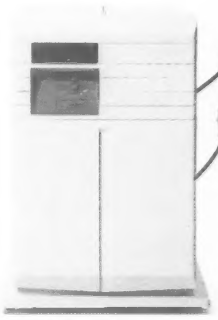
Credit Authorization



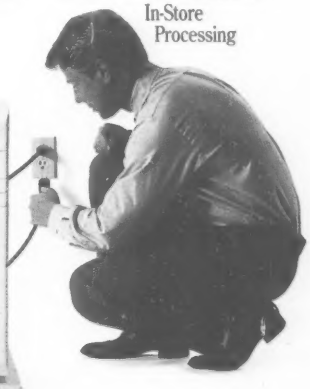
Securities Order Routing



Intelligent Network Services



Voice/Data Network Management



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DATA STREAM

Elisabeth Horwitt

Who'll drive the market?

We all know customer demand is supposed to drive the market. But in computers, it is application software that drives — or rather leads — the customer.

Nowhere is this more true than in networking. Six years ago, an upstart start-up called Novell made customers — and even IBM — take notice by brandishing an ever-expanding directory of personal computer software vendors that supported its Netware local-area network system. A year or two later, the LAN industry finally exploded when support from leading PC software vendors such as Lotus finally reached critical mass.

IBM's LU6.2 peer-to-peer protocol has yet to garner the kind of application software support it needs to appeal to information systems departments that can't afford to write their own programs. The fact that IBM has yet to produce a system-independent program interface for LU6.2 compounds the problem, since few users — or vendors — are willing to write a different version of an application for each type of IBM or non-IBM system being

Continued on page 71

Unisys looks outward to AT&T

BY ELISABETH HORWITT
CW STAFF

BLUE BELL, Pa. — While companies such as AT&T, Racal-Milgo and Nynex Corp. strive to produce "managers of managers" for their own and other vendors' networks, Unisys Corp. late last month announced intentions to make its own network management products subordinate to AT&T's Accumaster Integrator and to market the product as its own centralized system.

Unisys has signed an agreement to become a U.S. marketing representative for the Accumaster Integrator, the companies announced. Existing network management tools for the computer vendor's various product lines will become "element managers" that can send fault and traffic data up to the Integrator and receive configuration commands, according to Unisys Vice-President of Network Strategy Jerry Caccappolo.

By combining its own products with AT&T's in this way, Unisys addresses customers' growing demand for tools to manage different network subsystems locally, combined with "a way to get their arms around a holistic, total view of the network," Caccappolo said.

One Unisys shop, Pelican Homestead & Savings Association in Metairie, La., is likely to "grow into a centralized manager of managers" that could handle both Unisys hosts and T1 switches from Unisys subsidiary Timeplex, Inc., according to the bank's vice-president of data processing, Gerald LeBlanc. Right now, LeBlanc is concentrating on getting the T1 network up and running by year's end, and his people manage dif-

Continued on page 71

A manager's manager

The last month has seen vendors elbowing one another for the "manager of managers" title, with the following introductions:

- Racal-Milgo announced an IBM Personal System/2-based system that lays the foundation for centralized network management of its own and other vendors' T1 multiplexers, digital service units and modems.
- AT&T-Paradyne introduced a Unix-based system to manage the two sides of data communications and integrate those offerings with AT&T's Accumaster Integrator.
- Nynex has said it will announce a manager of managers offering early next year.

Open systems proof is in the demos at Interop

BY JOANIE M. WEXLER
CW STAFF

SAN JOSE, Calif. — A host of vendors faced a moment of truth at last week's Interop 89 show, when they got an opportunity to deliver on their interoperability promises.

In addition to the flurry of routing/bridging and network management product announcements, four major multivendor demonstrations of standards-based internetworking gave users a feel for the real-world possibilities of open systems. Users viewed Transmission Control Protocol/Internet Protocol (TCP/IP) running over Fiber Distributed Data Interface (FDDI); Netbios running over Open Systems Interconnect (OSI) protocols; and demonstrations of X Window System and Simple Network Management Protocol (SNMP), the network management protocol for TCP/IP.

The FDDI event was the first public demonstration of a multivendor FDDI network using TCP/IP, according to Advanced Computing Environments (ACE), the show's sponsor. Participating vendors included Fibronics International, Inc. and Hewlett-Packard Co.'s Apollo Division, which completed FDDI interoperability testing between Apollo workstations and the Fibronics FX8310 Router late last month.

Other participants were Proteon, Inc., Silicon Graphics, Inc., Sun Microsystems, Inc. and Unisys Corp.

Since the FDDI standard's Station Management (SMT) element, which handles internode connection and network management in an FDDI network, is not yet defined, the participating vendors retrofitted their proprietary codes to a common code for the sake of the demonstration, according to Peter de Vries, ACE's show project manager, and Hal Spurney, director of marketing at Fibronics. While the demonstration signified that multivendor FDDI is possible, the SMT adjustments showed that true FDDI interoperability is not yet applicable to a real-world situation.

"Vendors got tired of sitting around waiting for someone to say, 'This is FDDI — implement it!,'" de Vries explained. "They decided to adopt some standard to use in the meantime." He added that tweaking SMT once the standard has been decided re-

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Inside

- Star-studded start-up's streamlined server. Page 64.
- Bridge not too far for DG's MV Eclipse and Aviion lines. Page 67.
- DEC, Stratacom en route to LAN routers. Page 68.

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Startup streamlines servers

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — The first of an expected onslaught of servers streamlined for serving tasks was introduced recently by one of the few — but star-studded — Silicon Valley start-ups, Netframe Systems, Inc.

The hardware is said to provide mainframe throughput by using dedicated processors for I/O and file systems. An applications processor is set to follow early next year. Netframe claimed the systems can handle from five to 1,000 users and eight different local-area networks.

Led by Carl Amdahl as chief technical officer and Enzo Torresi as president, the company hit the ground with an exclusive distribution agreement through Businessland, Inc. and included support for Novell, Inc. and Microsoft Corp. operating systems from the beginning.

Amdahl is the son of computer pioneer Gene Amdahl and served executive stints at Magnuson Computer Systems, Inc., Trilogy Corp. and Elxsi Corp., while Torresi was a founder of Businessland.

Netframe is among the first to introduce a server that is specifically designed as such instead of as a repackaged minicomputer or workstation. Other such servers include Auspex Systems, Inc. and Omni Solutions [CW, Oct. 2].

Despite the rush into the market, Netframe is expected to do well. "It's like picking the low fruit on the tree; there's a great pent-up demand," said Brad Baldwin, an analyst at Dataquest, Inc. in San Jose. He added that the client base would likely be corporations with very large networking needs that have been reluctant to invest in personal computer LANs because of their unreliability.

Two machines based on Intel Corp.'s 80386 chip, the NF100 and NF300, will be available as supplies allow, said Businessland President David Norman.

Norman said his customers have been asking for a server that is resistant to crashes, and Businessland itself drew up specifications for such a machine. But none of the retailer's current vendors were willing to build it. Torresi then split off from Businessland and joined Netframe as its president to embark on the Businessland design.

Can they really?

One analyst, however, doubted the capability of Businessland to sell the new device. John McCarthy, an analyst at Forrester Research, Inc. in Cambridge, Mass., said, "They are also dealing with the Next [Inc.] issue. I question whether their sales force and service can deal with installations of this size."

While resting on a 386 platform, dedicated processors are intended to give the machine more capability. "All the mainframes today are used as huge file servers. Our architecture mimics the functionality of a mainframe," Torresi said. The two models start at $22,500 and $35,000; those prices do not include software. Another model based on the I486 chip will be available next year.

Amdahl said the servers are not designed to time-share like Unix servers but are "optimized for response time" rather than allocating time in a series of requests. "We take a mainframe approach. There are a series of independent buses running concurrently," he said.

Novell has ported its Netware 386 operating system to the server, as has Microsoft with its LAN Manager. Microsoft and Netframe are also working on OS/2 LAN Manager, expected to be available early next year.

While Businessland will be Netframe's initial distributor, discussions with such OEMs as Apple Computer, Inc., Ing. C. Olivetti & Co. and Xerox Corp. are developing, according to Torresi. Those three companies, among others, have invested in the start-up.

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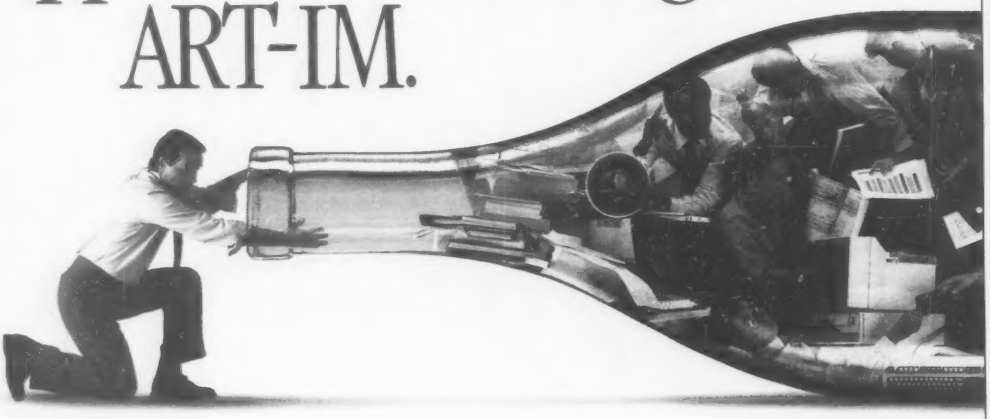

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DG to link up Aviion and Eclipse with NFS

Unix-based system helps in open environment

BY MARYFRAN JOHNSON
CW STAFF

WESTBORO, Mass. — With an eye to bridging the gap between its MV Eclipse and Aviion computer lines, Data General Corp. plans to offer Sun Microsystems, Inc.'s Unix-based Network File System (NFS) within the next six months for its proprietary operating system, AOS/VS II.

Company officials confirmed that the file-sharing software — already in place on its Unix-based Aviion machines — is one of several "open systems" products earmarked as key parts of DG's new survival strategy in today's multivendor environment.

Adding NFS to its AOS/VS operating system would allow thousands of MV Eclipse users to access data and share files with Aviion workstations and servers, which made their debut last February and began shipping this summer.

Network File System, which is owned and licensed by Sun Microsystems, has emerged as an industry standard. Sun has sold more than 260 NFS licenses so far, with at least 90 of them to major systems vendors, a company spokesman said.

DG's Distributed Applications Architecture (DAA) is designed to allow users to distribute the company's applications across a network of diverse machines and operating systems.

DG's installed base of Eclipse machines is worth $1 billion in sales and services annually to the 21-year-old company immortalized in Tracy Kidder's *Soul of a New Machine.*

DG spokesman Andy Hettinger stressed that DG is not forcing an Aviion migration on an installed base of more than 30,000 MVs. "We are not telling those customers they have to move to Aviion," he said. "They can stay with MVs forever if they want. But we don't want to keep those two lines of customers separate." DG continues to ship about 1,500 MV units each fiscal quarter, according to Hettinger.

Support of popular multivendor communications protocols "is definitely something users are demanding," said Joanne Womboldt, senior manager of core network products at Prime Computer, Inc., which began marketing NFS for its Primos proprietary operating system last March.

Several industry analysts said bridge-building between competing product lines is well under way at other computer companies. Both IBM and Digital Equipment Corp. have long offered NFS on their operating systems.

"There is an extremely large amount of play in the marketplace now for compatibility and standards," said Alex Nedzel, a principal consultant of Index Group, Inc., in Cambridge, Mass. "All of this is an absolute trend, which really started with the Open Systems Foundation a year or two ago."

"Data General is not unique in wanting to transition its installed base from proprietary to standard platforms," said Ann Palermo, director of office systems research at International Data Corp. in Framingham, Mass. "But it's a tricky and delicate job."

NEW DEALS

MCI/Du Pont deal inked

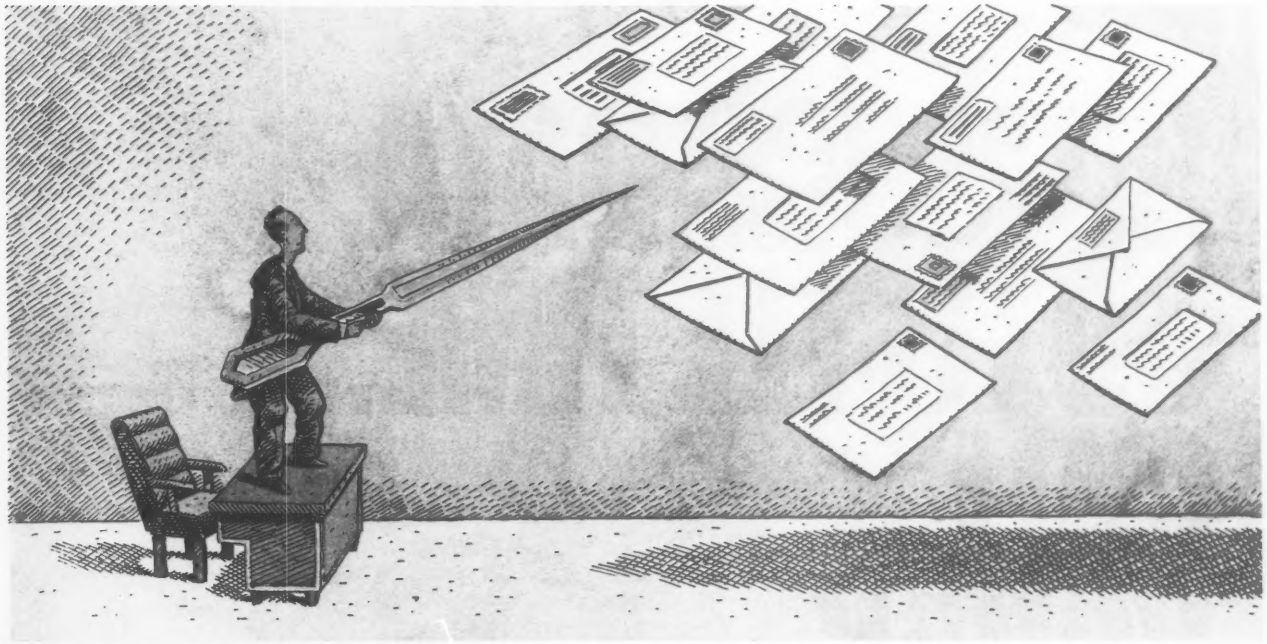
Du Pont Co. has selected **MCI Communications Corp.** to interconnect Du Pont's 75,000 electronic mail users via MCI Mail and the CCITT X.400 E-mail standard. MCI's E-mail service will connect users on a variety of proprietary and X.400-compliant systems, both in the U.S. and overseas, MCI said.

Management consulting organization **Bain & Co.** has installed videoconferencing systems from **Picturetel Corp.**, both in London and at its Boston headquarters. The new system allows Bain's consultants to meet face-to-face with each other and with customers without having to travel to individual sites in person.

Nynex Corp. subsidiary **Nynex Information Solutions Group** has signed a contract to head a project team that will design, install and maintain a computerized revenue collection system for the three major airports run by the **Port Authority of New York and New Jersey.** The contract is said to be worth $33.5 million.

AT&T has landed a multimillion dollar contract to deliver network television programming for **Capital Cities/ABC, Inc.** via satellite link. AT&T has also signed up **GE Astro-Space Division** to design and build Telstar 4 series satellites, which AT&T will then use to deliver satellite-based communications services to its customers.

Contel ASC has landed contracts with a total value of $2.4 million to provide satellite communications networks for **Fireman's Fund Insurance Co., United Stationers** and **Browne & Co., Inc.** The networks will be used as backup facilities to take over communications when the companies' principal network links fail.



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DEC, Stratacom plan routers

BY ELISABETH HORWITT
CW STAFF

Digital Equipment Corp. and Stratacom, Inc. have agreed to work together to develop routers that can dynamically allocate bandwidth to meet the constantly shifting demands of LAN-to-LAN traffic.

The two vendors announced last week that they will integrate DEC's Open Systems Interconnect (OSI) local-area network routers with Stratacom's fast-packet T1 switches "to provide Decnet and OSI backbone network users with a series of tools to manage bandwidth and increase network performance," said Stratacom Vice-President of Marketing William Strensrud.

Most existing routers allocate a fixed amount of bandwidth, such as 1.5M bit/sec. or 64K bit/sec., to a point-to-point remote connection between two LANs, according to Thomas Nolle, president of Haddonfield, N.J., research company CIMI Corp. This results in "the classic problem of having to allocate a lot of bandwidth between two LANs, just because you don't want congestion on the router during peak traffic periods," Haddonfield said. Given the "bursty nature" of LAN traffic, "a lot of times nothing is going on, and you're paying full price for those links," he added.

Stratacom's IPX fast-packet switches convert voice and data transmissions into packets and then intermix those packets, eliminating the need to allocate fixed bandwidth to either type of transmission, said DEC Director of Enterprise Networks Marketing Lee Sudan. When LAN-to-LAN traffic gets heavy, a router linked to an IPX switch would be able to give LAN users whatever portion of a 1.5M bit/sec. T1 connection that is not being used by voice traffic, Sudan added. Alternatively, multiple LANs can share the same router-to-IPX connection, with T1 bandwidth allocated to each LAN on the basis of need.

Shift in LAN strategy

The DEC-Stratacom announcement is an early harbinger of a growing "shift in strategy for LAN linkage, away from fixed toward variable bandwidth allocation, because that's the only cost-effective way to do it," Nolle said.

Fast-packet services from carriers, as well as other types of dynamic bandwidth allocation, should come into their own shortly, he indicated.

By lowering the cost threshold for interconnecting workgroup LANs of VAX users, a fast-packet router could become a key part of DEC's enterprisewide networking strategy, Nolle said.

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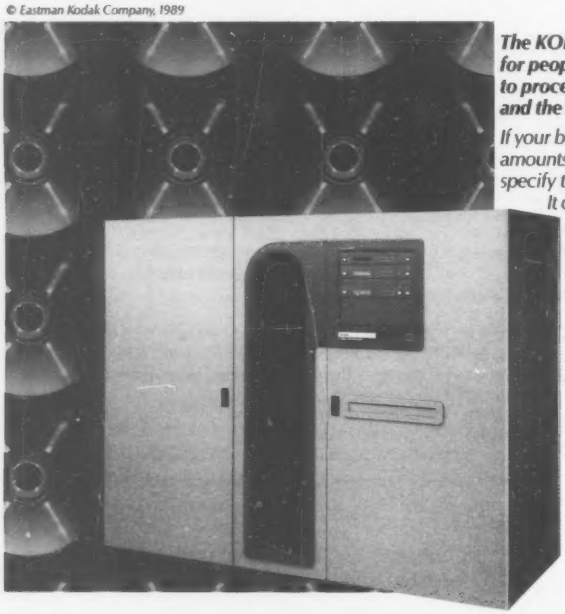

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Interop

FROM PAGE 63

quires a fairly simple software change.

All Interop demonstrations except Netbios-over-OSI ran on a common Ethernet backbone. All except FDDI involved communications that used "solid" standards, said de Vries, who added that users could see Appletalk, DEC's Decnet and Local-Area Transport, OSI, TCP, Netbios, Banyan Systems, Inc.'s Virtual Networking Software and Novell, Inc. protocols operating together on the backbone.

A step toward standards

This year's show could represent a big step toward a standards-based world in which vendors compete with value-added software, not on their ability to interoperate.

"This year's products were off-the-shelf; they reflected real life," said Denise O'Connor, program manager for Unisys.

O'Connor observed that the Interop audience has evolved from the "pure technocrat to the business manager, because the standards-based environment is for real."

Multiprotocol routers a hot item at Interop 89

BY JOANIE M. WEXLER
CW STAFF

A trade show on interoperability would hardly be complete without a few product introductions to expand users' options for internetworking. Multiprotocol routers, in particular, were a popular bill of fare at last week's Interop 89 show in San Jose, Calif.

Proteon, Inc., for example, enhanced its P4100 and P4200 routers with additional protocol support, including Fiber Distributed Data Interface (FDDI), Open Systems Interconnect (OSI), Appletalk and X.25. Proteon also announced that it would support the Open Shortest Path First (OSPF), a nascent protocol designed to provide for more effective routing among multiple local-area networks using Transmission Control Protocol/Internet Protocol (TCP/IP).

Appletalk, X.25 and OSPF support are set to be available in mid-December; FDDI and OSI support are scheduled for availability during the first half of 1990. The routers handle approximately 1,000 packets per second, according to the company.

Wellfleet Communications, Inc. added a low-end multiprotocol router/bridge, the Feeder Node (FN), to its existing router line that includes the midrange Link Node and high-end Concentrator Node. FN is available immediately, and its price ranges from $8,995 to $9,995.

Wellfleet supports TCP/IP and Decnet now and plans to support Xerox Network Services (XNS) in the future, according to the company.

Cisco Systems, Inc. introduced an FDDI router that is said to provide intelligent internetworking for 14 different networking protocols, including Decnet, TCP/IP and OSI.

A company spokeswoman explained that users who have Cisco routers now can upgrade to FDDI without having to throw away old hardware.

Scheduled to be available in the first quarter of 1990, the Cisco FDDI router is $38,000 for a configuration linking one FDDI to two Ethernet LANs. Information on throughput is not yet available, according to the spokeswoman.

DCA/10net unveiled 10net TCP software to allow 10net LAN users to communicate with other TCP/IP-based computing platforms.

Vendor views differed about the importance of throughput in their routing products. The issue was all but dismissed by Nate Kalowski, vice-president of marketing at Proteon, who said that the speeds reach a point of diminishing returns when they are able to "fill" network bandwidth.

"Routers operating at about 1,000 packet/sec., for example, can fill a T1 line, which is what the industry is using now," he asserted. "It would take somewhere between 5,000 and 10,000 packets per second to fill a T3 line. More throughput doesn't help."

But Karen Barton, director of product marketing for Wellfleet, countered, "Remember, the greater throughput is supporting not only the local-area-to-wide-area connection, it's also supporting a local-area-to-local-area connection in the same box. That automatically means you need higher performance."

Easy mainframe access promised with Rumba

BY SALLY CUSACK
CW STAFF

REDMOND, Wash. — With an eye toward simplified mainframe access, Wall Data, Inc., last week announced a desktop-to-mainframe software program running under Microsoft Corp. Windows.

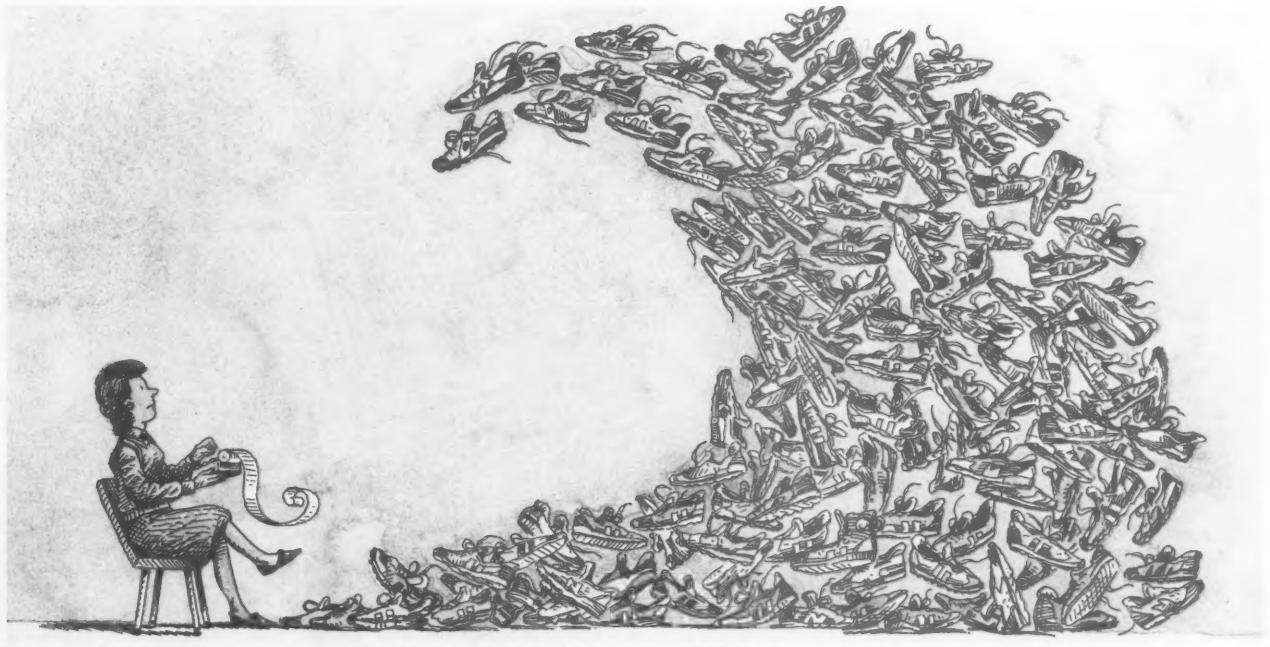
Dubbed Rumba, the product utilizes Windows technology to enable users to reach mainframe applications via a graphical interface. According to John Wall, the company's chairman, the program was created especially for non-power users — such as executives, secretaries and financial analysts — who require access to mainframe applications.

Rumba requires no special training or manuals, the vendor said, and is capable of operating in an IBM 3270 environment. Features include keyboard and color remapping and cut-and-paste functions as well as automatic data parsing and file transfer. It requires an IBM Personal Computer, XT, AT, Personal System/2 or compatible with Enhanced Graphic Adapter display resolution or higher.

The software reportedly requires 39K bytes of memory for the first session and 25K bytes for each additional session. It operates with most IBM mainframe connection types, including IBM or compatible coaxial cable, Token-Ring, Synchronous Data Link Control adapter and Netbios local-area networks. It also offers transparent connection to IBM CICS, TSO and VM/CMS operating platforms.

> THE PROGRAM was created especially for non-power users.

Slated for delivery by Oct. 16, Rumba is user-customizable and is priced at $595. According to the company, development kits will be made available for linking to IBM's High-Level Language Application Programming Interface, LU6.2 and Server-Requester Programming Interface.



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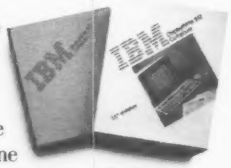
DisplayWrite 5/2 Composer



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T&R Textiles INC.
MEMO TO: M. Scott
FROM: H. Green
SUBJECT: Status Report
Mike, here's a quick update on how things have been going in your absence. I'll make it mercifully brief; after all, your vacation isn't officially over 'til Monday.
First, feast your eyes on this layout for the fall issue of FA. That's one of our new designs on the cover, as if you didn't know. Looks like our PR efforts really paid off.
More good news: our new DisplayWrite 5/2 Composer is up and running, and as you can see from this memo, calling it just a word processor is probably the understatement of the year. I think it's going to be a terrific productivity/communications tool around here.
Okay, so much for the software review. Back to business. As you probably know, it's getting to be commitment time on Project Moonrise. One of us is going to have to have a meeting with McCarthy to get the final details hammered out. The week of the 17th is about the latest we can let it go and still give ourselves enough time to complete the order. What I'd like to suggest is that you and I go as a team; that way I'll be in a position to step in and handle things if it turns out you have to go back out to the Coast. I know it looks unlikely at this point, but I think you'd ultimately feel more comfortable if we were both up to speed
(1)
FASHION AVE MAGAZINE
MARKET SHARE (%)
Here's the fabric sales info you asked about...
One of the first sketches for the evening-wear project.

Horwitt

FROM PAGE 63

linked into an LU6.2 network.

The X.400 electronic mail standard has only begun to take off now, because vendors of existing E-mail software packages and services have begun to use the standard as the basis for multivendor interoperability.

Something to watch right now is the X.400 Application Program Interface Association's development of a standardized interface between X.400 servers and non-E-mail packages. This would allow a spreadsheet or database program to automatically send a file to another X.400-compliant system across a local- or wide-area network.

So far, Lotus is the only PC software vendor that has joined the association. But when the interface is firmed up, there is a good chance other software vendors will jump on board, given the widespread support of X.400 and the fact that no competitive "standard" exists.

Unfortunately, there is no distributed computing standard comparable to X.400 for application and networking vendors to flock around. The technology is too new, the functionality involved too complex and the Open Systems Interconnect (OSI) standards still under development.

As a result, two vendor contingents are competing for the right to have their particular distributed computing protocols become an industry standard — de facto or otherwise. One set of strange bedfellows is HP-Apollo and DEC; the other is Sun, Netwise and Novell. Both groups have proposed to the Open Software Foundation a remote procedure call (RPC) architecture that is supposed to provide the foundation for distributing applications across a network.

To hear these groups tell it, their aim is entirely selfless: They want to encourage software developers to start writing distributed applications by shielding them from the intricacies of networking. The Sun-Netwise-Novell bunch also claim that their architecture is "transport-independent" — that is, applications written to their interface will run over all kinds of LANs. OSI support will come from Netwise; 3Com and Banyan have committed to implementing the architecture on their systems.

MEANWHILE, SUN AND HP-Apollo will try to extend their distributed computing platforms across as many software, networking and computing environments as possible, each hoping to gain the title of "de facto industry standard."

More impressive is the fact that a number of major software companies have announced intentions of using Sun-Netwise-Novell's platform to distribute their applications. Informix, Lotus, Oracle, Microrim, Relational Technologies, Sybase, Unify — except for Lotus, the list reads like a who's who of database companies. DEC and HP-Apollo don't have their own rostrum of supporters to set against this.

The question is: Why do these guys have to set up competing standards, anyway? Both groups claim to be staunch supporters of the International Standards Organization's OSI protocols, which include or will include RPCs and other distributed networking features. I don't buy the classic line of "OSI isn't here yet, so we're providing a stopgap."

I think a Sun spokesman hinted at the answer when he said that RPCs are not the real issue; other aspects of distributed computing are. He was referring to the functionality of a full, proprietary platform — like Sun's or Apollo's — that can keep track of resources, route requests to the right source and troubleshoot a distributed network. OSI protocols are unlikely to deliver comparable functionality for a while.

Meanwhile, Sun and HP-Apollo will try to extend their distributed computing platforms across as many software, networking and computing environments as possible, each hoping to gain the title of "de facto industry standard." Whether this will help them dominate the workstation market is another question; standards bearers do tend to attract followers.

Horwitt is a *Computerworld* senior editor, networking.

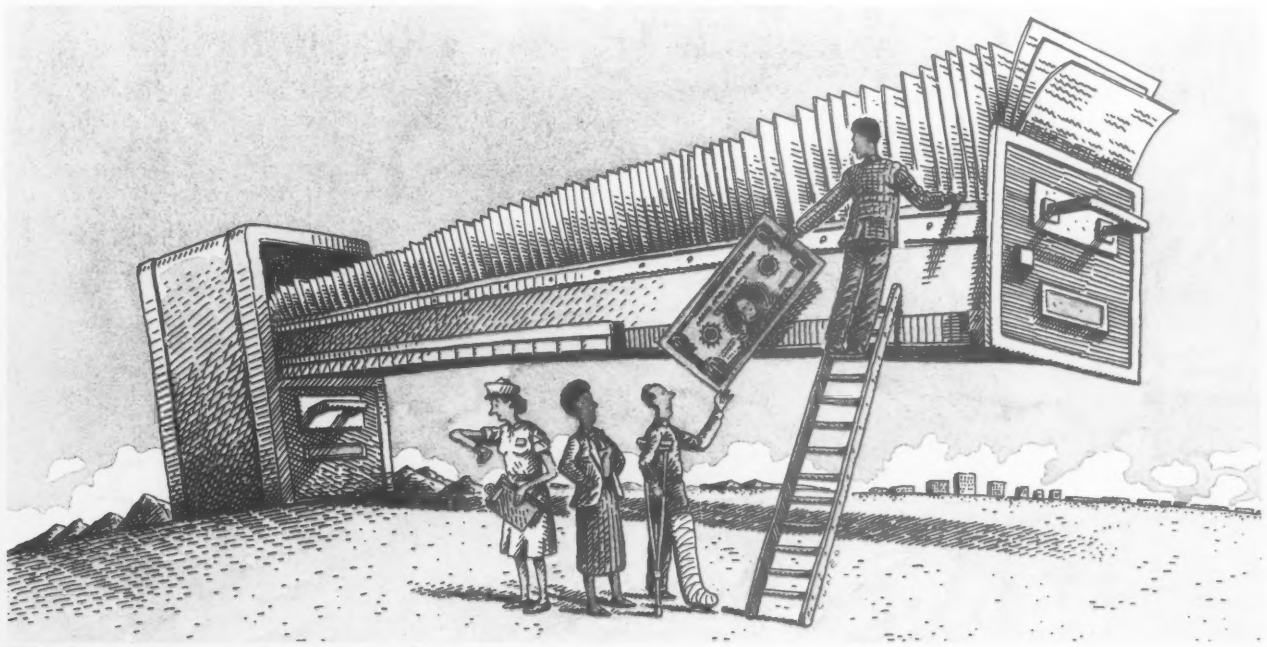
Unisys

FROM PAGE 63

ferent aspects of the network using "tools for individual things. But there are obviously a lot of other benefits to [a centralized] system; maybe in the future I will be interested."

"The 'manager of managers' arena is very difficult to be in, [and would] require expending a lot of resources, yet customers need such solutions," Caccappolo said. "We felt that AT&T's product offered the best way of doing that." AT&T's emphasis on the physical networking environment also complements Unisys' logical orientation as a computer vendor, to provide a comprehensive management system, Caccappolo said.

Unisys is revamping all of its existing network management tools to provide "tighter integration with the Integrator than just an interface," Caccappolo said. The tools include management systems for Unisys subsidiary Timeplex' Link T1 switches; Unisys' Open Systems Interconnect and Transmission Control Protocol/Internet Protocol local-area networks; and data communications products specific to the Burroughs and Sperry computer lines, Caccappolo added.



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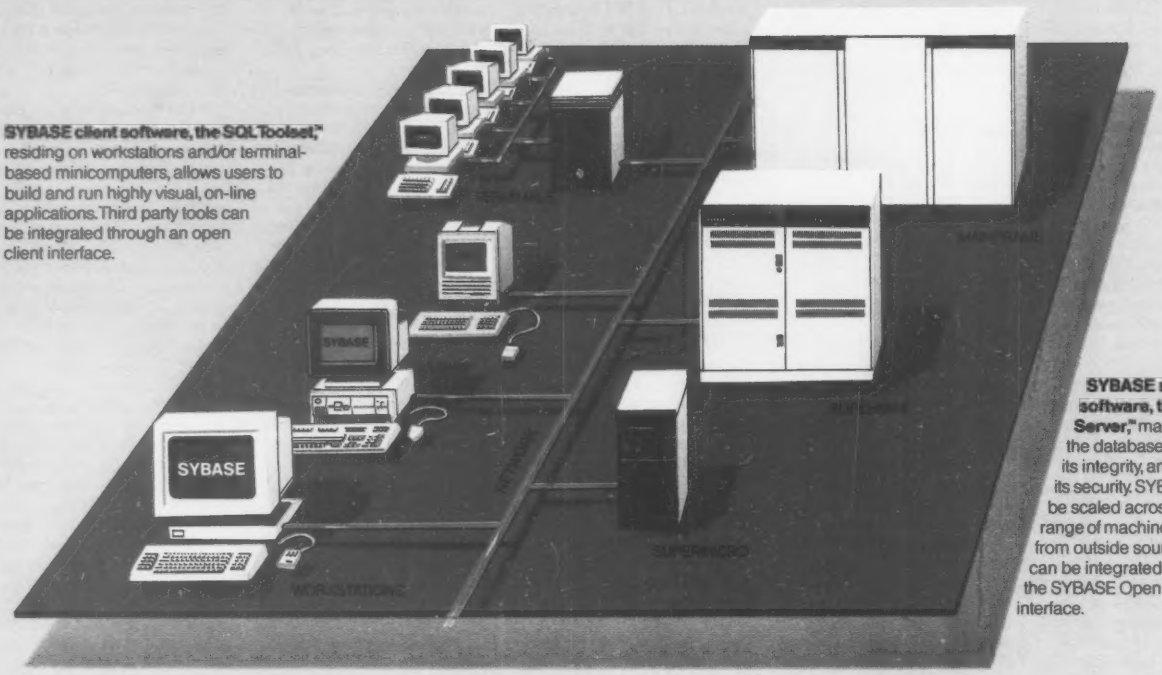

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#23 St. Louis, MO	10/24	#30 Minneapolis	11/07
#24 Milwaukee	10/26	#31 Orange Cty. CA	11/08
		#32 New York City	11/09
		#33 Phoenix	11/09
		#34 Boston	11/14
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NEW PRODUCTS

Local-area networking hardware

Cabletron Systems, Inc. has introduced its series of desktop network interface (DNI) cards for IBM and Apple Computer, Inc. systems.

The DNI series includes diagnostic capabilities and was designed to operate with IBM XTs, ATs, Personal System/2s and compatibles, as well as with Apple's Macintosh SE, Macintosh SE/30 and Mac II (Nubus) systems, the company said. The product provides an interface to support coaxial, fiber-optic and unshielded and shielded twisted-pair cabling.

According to the company, the cards comply with current physical media standards, including IEEE 802.3 10 Base2, Base5 and FOIRL, as well as with the forthcoming 10 BaseT standard.

The DNI series cards cost between $395 and $695, depending on memory configuration, the firm said.

Cabletron Systems
10 Main St.
Rochester, N.H. 03867
603-332-9400

Hughes Lan Systems, Inc. has introduced a local-area network adapter card that reportedly provides full IBM 3270 emulation.

The 6150 Ramanager was reportedly developed to accommodate 4M and 16M bit/sec. token-ring connectivity and user applications. These emulation features operate simultaneously within the standard memory capacity of DOS workstations, the vendor said. The product is targeted at personal computer users who are experiencing or anticipate a memory problem in the DOS workstation environment. It fits into a single slot of an IBM PC, XT, AT, Personal System/2 or compatible and is priced at $1,195 per card.

Shipments are expected to begin in the first quarter of 1990.

Hughes Lan Systems
1225 Charleston Road
Mountain View, Calif.
94043
415-966-7300

Intellicom, Inc. has unveiled a low-end asynchronous server for multipersonal computer office applications.

The Quick-Net 1000 Asynch Server series was designed as an alternative to Token-Ring- and Ethernet-based solutions for the small multi-PC office environment, the company said.

The product is priced from $799 for a configuration of four serial and one parallel ports, and models are available to support as many as eight serial and two parallel direct port connections. All models are covered by a two-year warranty.

Intellicom
9259 Eton Ave.
Chatsworth, Calif. 91311
818-882-8866

Local-area networking software

Coconet, Inc. has unveiled the Coconet 1.3 Netbios Unix/DOS network, which allows Novell, Inc. network users to add AT&T Unix System V, Release 3 capabilities to their workstations.

The product reportedly provides Novell users with virtual terminal log-ins to Unix and offers full access to Unix file system and print-spooling facilities. The network offers transparent file sharing from Novell or Unix servers or both, according to the vendor.It also reportedly supports Ethernet, thin Ethernet and twisted-pair Ethernet.

The product costs $2,595.

Coconet
Suite E
4275 Aurora St.
Coral Gables, Fla. 33146
305-4474608

Links

Triton Technologies, Inc. has released Version 4.0 of Co/Session, the company's remote computing software package.

According to the vendor, the latest version provides enhanced graphic support and faster file-transfer capabilities. The software also provides error checking for file transfers, keystrokes and screen data, and additional modem support has reportedly been added for optimizing high-speed and Microcom Networking Protocol error-checking modems.

The product requires MS-DOS 2.0 or higher and is priced from $125.

Triton Technologies
200 Middlesex Essex Tnpk.
Iselin, N.J. 08830
201-855-9440

Heritage Communications Systems, Inc. has announced a line of hardware and software products that have been developed to give IBM Personal Computers, Personal System/2s, Toshiba America, Inc. laptops and compatibles the ability to access IBM mainframes via Category A coaxial adapters.

The 3270 Platform series includes a 2278/79 emulation software package and one of three printed-circuit boards to allow the PC to connect directly to an IBM cluster controller, according to the vendor.

Prices range from $349 to $399.

Heritage Communications Systems
Suite 104
1 W. Deer Valley Road
Phoenix, Ariz. 85027
602-780-1497

OS/2 networking

Gateway Communications, Inc. has released OS/2 software drivers for use with its G/Ethernet local-area network adapter.

The drivers are said to be compatible with Microsoft Corp.'s OS/2 LAN Manager, including an original equipment manufacturer's version. G/Ethernet can be used to network IBM Personal Computers, XTs, ATs, Personal System/2s and compatibles, the company said.

Gateway Communications
2941 Alton Ave.
Irvine, Calif. 92714
714-553-1555

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Gateways, bridges, routers

Case/Datatel, Inc. has unveiled an Ethernet wide-area network/local-area network (WAN/LAN) gateway that has been designed to connect the company's DCX WANs to Transmission Control Protocol/Internet Protocol LANs.

Designated the DCX8023 Ethergate LAN/WAN Gateway, the product allows asynchronous terminals residing anywhere on the LAN to directly access all facilities on the DCX WAN and vice versa, the vendor said.

The DCX8023 Ethergate is a Motorola, Inc. 68020-based circuit module that is installed in a Case/Datatel DCX840 or DCX850 communications processor. The gateway reportedly can support as many as 64 LAN and WAN users. The DCX8023 is priced at $11,500, and pricing for the DCX840 communications processor starts at $8,460.

Case/Datatel
Cherry Hill Industrial Center
55 Carnegie Plaza
Cherry Hill, N.J. 08003
800-424-4451

Electronic mail

MCI Communications Corp. has announced a software messaging gateway for users of Microsoft Corp.'s Microsoft Mail product.

MCI Gateway for Microsoft Mail is designed to enable users to add the delivery and handling options contained within MCI Mail to their Apple Computer, Inc. Appletalk local-area networks, according to the vendor. Users can then send messages for worldwide postal, courier, facsimile and telex delivery as well as for electronic delivery to any MCI Mail subscriber or user of any other electronic messaging systems that have been registered with MCI Mail.

The MCI Gateway for Microsoft Mail is scheduled to be available from Microsoft this month. It will carry a retail price of $595.

MCI
Two International Drive
Rye Brook, N.Y. 10573
914-934-6480

Consumers Software, Inc. has enhanced its stand-alone dial-in software that allows users to dial in to the office for their electronic mail over regular telephone lines.

PC Postoffice 2.0 reportedly includes an option that permits users to choose which messages they want to download to a remote location and those they wish to keep on the home office personal computer. The product is aimed at salespersons, accountants, real estate agents and traveling executives who have laptop computers.

It is priced at $495 per post office hub and requires a minimum of 256K bytes of random-access memory.

Consumers Software
603-73 Water St.
Vancouver, B.C., Canada V6V 1A1
604-688-4548

Diagnostic equipment

International Data Sciences, Inc. has announced a data communications test set that provides analyzing and monitoring functions for both local- and wide-area networking environments.

The Model 5430 Sherlock LW test unit incorporates an NEC Corp. 286 portable flat-screen personal computer with a 20M-byte hard disk. The product can decode IBM Systems Network Architecture, X.25, asynchronous and synchronous protocols, the vendor said. It also can trap, monitor and time-stamp live data. The test set is priced from $15,200, and a V.35 interface is available for $395.

International Data Sciences
7 Wellington Road
Lincoln, R.I. 02865
800-437-3282

Electronic data interchange

Control Data Corp.'s Redinet Services Business Unit has introduced Redi-Translator, a software product designed to help companies respond efficiently to new public standards in electronic data interchange.

The product reportedly runs on a variety of hardware platforms, including those from Digital Equipment Corp. and Hewlett-Packard Co., as well as on IBM mainframes. The software allows users to handle all transactions defined in ANSI X12 format standards and can be integrated with customer's existing applications, according to the vendor.

Redi-Translator costs $25,000 per copy.

Redinet Services
500 W. Putnam Ave.
Greenwich, Conn. 06830
203-622-2297

Modems

Western Datacom has introduced the 432 Line Backer, a CCITT V.32-compliant 9.6K bit/sec. modem that reportedly can store up to 48 telephone numbers and access codes for its call-back security and automatic-dial backup modes.

The product features synchronous and asynchronous operation, supports Microcom Networking Protocol error correction and 2-to-1 compression through Class 5, as well as a variety of standard protocols. The price is $1,295.

Western Datacom
P.O. Box 451113
Cleveland, Ohio 44145
216-835-1510

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2. Free accommodations and conference admission. Second Prize winner will receive three nights accommodations at the Grand Hyatt, plus one in-depth tutorial and free admission to the full conference and exposition. Approximate total value: $1,375.
3. Free conference admission. Third prize, valued at $895, includes your choice of one day-long, in-depth tutorial and full conference and exposition admission.

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Entry Form must be filled out with *all* information requested and received at the address shown NO LATER THAN November 30th, 1989. One entry per person; one prize per person. No registration is required to enter, but if you win after you have registered, you will receive a full refund. Winners will be chosen at random and announced on December 15th, 1989. Decision of the judges is final. All residents of the continental U.S. and Canada 18 years or older are eligible, except employees of International Data Group, its agencies, affiliates or subsidiaries. Winners must consent to the use of their names and photographs in contest publicity.

For a copy of the complete contest rules, or a list of winners, send a self-addressed stamped envelope to Communication Networks '90, P.O. Box 9171, Framingham, MA 01701.

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List the five communications/networking topics in which you are most interested:

1. _____
2. _____
3. _____
4. _____
5. _____

(NB1

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Communication Networks Contest
P.O. Box 9171, Framingham, MA 01701-9171

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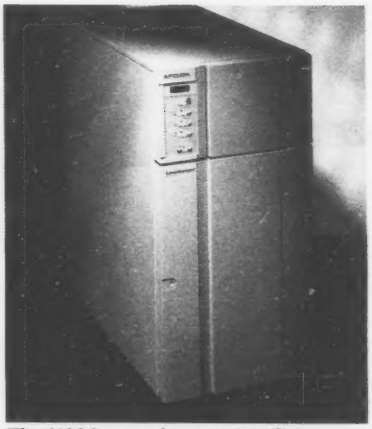
For example, for bulk file transfers between hosts, the LinkMaster 6100C network processor allows files on a host to be sent quickly and effectively to not just one, but multiple hosts in multiple locations.


The 6100C network processor utilizes existing channel connections for direct NetView interface.

MCD

Using the LinkMaster 5000 series of channel extenders, disaster recovery backup tapes can be made offsite whenever they are needed, eliminating the time and expense of manual tape transportation.

The 5000 series of channel extenders can be installed in less than one hour.

LinkMaster 4174 controllers interconnect 3270 terminals, ASCII terminals and PCs to multiple hosts, either DEC or IBM. And LinkMaster products enhance network management with direct NetView interface.

These are just a few highlight examples of McDATA's LinkMaster network solutions at work.

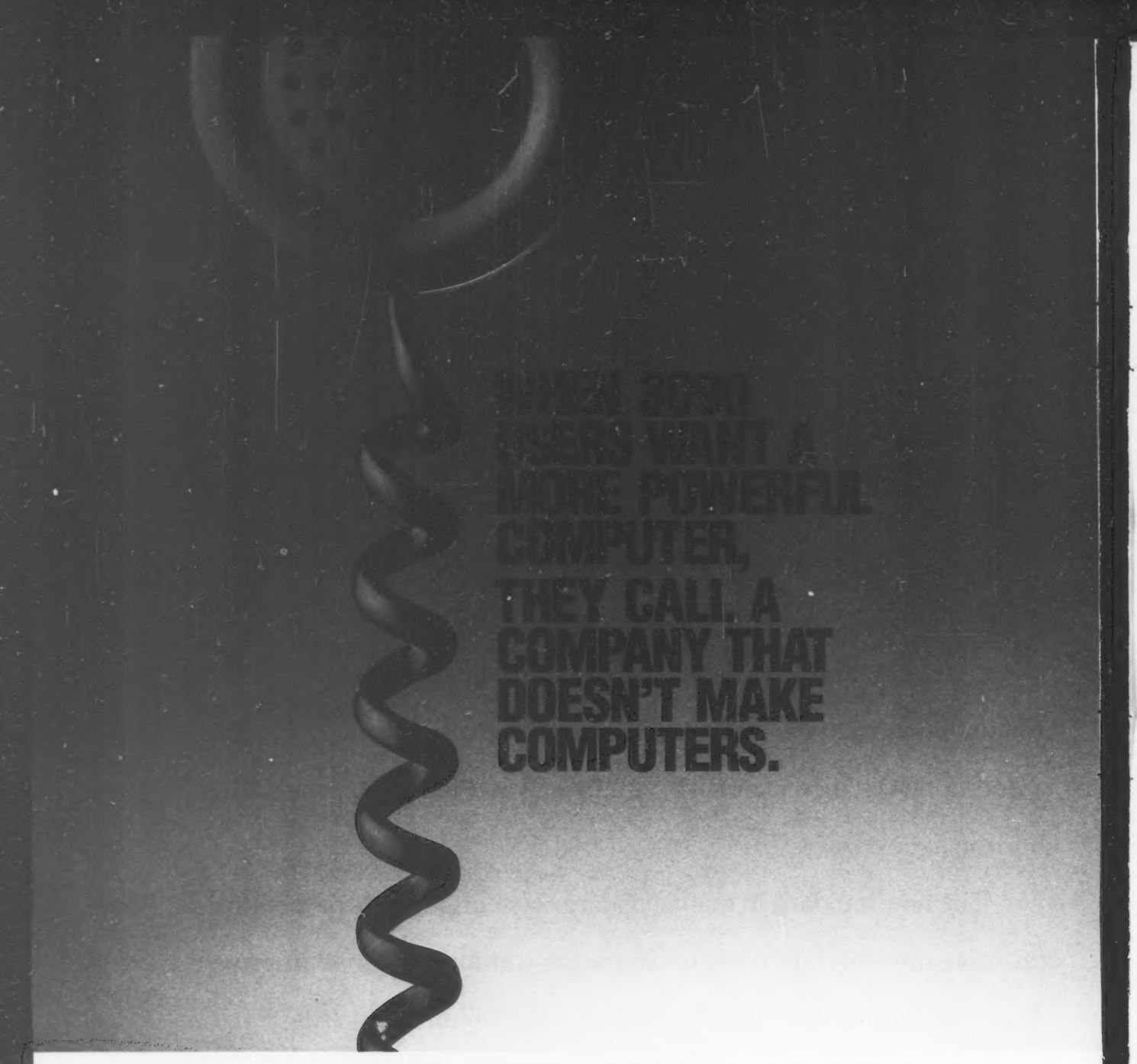
LinkMaster goes beyond compatibility to the next stage of the network communications evolution, a comprehensive multivendor connectivity which, in high-speed, long-distance channel communications, represents the next significant horizon to be crossed.

The new standard in managing large systems involves faster, more economical, more rational channeling of data across communications barriers which previously could not be spanned. McDATA is establishing that standard.

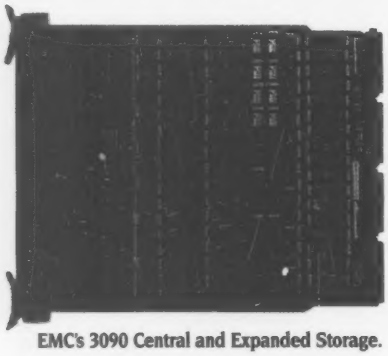
We span the gaps in network communications. **McDATA**

McDATA Corporation 310 Interlocken Parkway Broomfield, Colorado 80021 (303) 460-9200 **Boston/Chicago/Dallas/Atlanta/Los Angeles/San Francisco/Washington, DC/London/Munich**

DATA



WHAT'S GOTTEN INTO THEM?



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MANAGER'S JOURNAL

EXECUTIVE TRACK

Irwin J. Sitkin, the former vice-president of corporate administration at Aetna Life & Casualty in Hartford, Conn., has been named a part-time consultant at **Memorex Telex Corp.**

Sitkin will advise the senior management of Memorex Telex on marketing and business strategies in the senior-level information systems market. Sitkin retired from Aetna earlier this year after 35 years. He remains a consultant to Aetna's Office of the Chairman on IS.

Sitkin has also been elected to the board of directors of **Data-Switch Corp.,** a maker of data communications equipment in Norwalk, Conn.

.....

Paul E. Zencka, former director of management information services at The Ceco Corp. in Oak Brook Terrace, Ill., has been named a principal in the Chicago-area office of **St. John's Consulting Group.** Zencka, 46, has had a 26-year data processing career.

Based in the Northbrook, Ill., office, Zencka represents St. John's in consulting areas that include data center relocation, capacity and contingency planning and manufacturing systems strategies.

.....

Jerry Lynch, a former vice-president in the MIS division of Shawmut Bank N.A. in Boston, has been named technical manager for the New England region at **Atlantic Data Services, Inc.,** a Quincy, Mass.-based vendor of software services to the financial industry.

.....

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld,* Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Governing IS by consensus vote

Management at the Mayo Clinic means knowing the ways and means of committees

BY J. A. SAVAGE
CW STAFF

Walter Menning attends more meetings in a month than some people do in a lifetime. Every strategy and every procurement in informations systems is examined and reexamined like a neurological X-ray before delicate surgery.

Menning, vice-chairman of information systems at the Mayo Clinic Foundation in Rochester, Minn., may wield authority, but he is ultimately governed by committees. Most of those do not contain information systems professionals, but professionals in medicine.

"It's certainly slow," says Menning, who estimates he spends 30 hours a week in meetings. "Committees and process are an integral part of the way Mayo functions, and IS is no different."

The Mayo Clinic is noted for some of the best health care in the country, and former President Reagan recently came to the clinic for brain surgery.

The Information Systems Management Committee is chaired by a physician whose father was an IS director. Above that is a Clinical Practice Committee; above that, an executive committee; and finally, there is the board of directors.

There is also a committee for prioritizing the committees, another for dealing with security issues and one for purchases of less than $100,000 — just to name a few. The flow chart tends to run off the blackboard.

"It takes us three to six months to do what General Motors can accomplish in five minutes," says Robert Tancredi, chairman of the Information Systems Management Committee and a cardiologist. "Government by consensus drives me batty, but it really works."

ALVIS UPITIS

Mayo Clinic Foundation's Menning *spends a lot of his time in meetings*

Currently, many of the meetings are devoted to a major project to integrate the clinic's systems with the two Rochester hospitals it has acquired, Methodist and St. Mary's. Integrating the three is a practice run for future integration of the three Mayo Clinic Foundation campuses in Rochester, Scottsdale, Ariz., and Jacksonville, Fla.

The first common applications for the three Rochester sites will be IBM mainframe-based accounting systems and payroll and some Digital Equipment Corp. VAX-based clinical systems for lab support.

The foundation plans to hire outside contractors for much of the development, and the initial contracts are expected to total about $20 million, Menning says.

Menning is attempting to merge the three hospitals' data centers with the consensus of staff designees from all three. Menning and members of his 400-person staff prepare options for the committees to choose from, or elaborate upon.

"Those sessions become a forum to educate and inform on a person-to-person basis, rather than having to do it postdecision via newsletter," Menning

Continued on page 82

Darwin's rule looms large for businesses

BY ALAN J. RYAN
CW STAFF

During the 1990s, companies will either make history or be history.

That is, according to Gary K. Gulden, senior vice-president of the Index Group, a Cambridge, Mass.-based information systems management consulting firm. At a recent seminar, Gulden said that time and technology are the competitive factors for businesses in the coming decade. The reasons include hardball global competition, new technically adept competitors, consolidation and power shifts in the marketplace, shrinking product life cycles and the demands of shareholders.

To remain competitive, Gulden said, it has become critical for companies to use information technology effectively. "Those that haven't started [using technology to gain a competitive edge] probably will not make it in the 1990s," said Adam D. Crescenzi, another Index senior vice-president. "Companies are talking about survival."

Education is one key to success, Crescenzi said. All IS managers and departments should be working on ways to educate their bosses, their peers and their companies on why systems must be at the forefront of change.

"From the day you have an idea or vision until the day you change it," that educating process must take place, he said.

Additionally, the chief executive officer should be involved in the widespread vision for systems. If the CEO is concerned about his company's survival, he must get involved at the systems planning level, Crescenzi said.

For the 1990s, automating the basic business processes will still be a viable way to see some improvements in customer service, but those incremental improvements should be thought of as typical business expenses and not systems spending.

Instead of using technology to achieve a "better sameness," Gulden said, the major systems plans should be geared to create "industrial-strength" alterations such as making the firm more responsive to changes in the marketplace, shedding excess expenses and redundant employees and being able to create customized products using mass-production economics.

MCI exec lists shortcomings, sparking ire of SIM members

BY CLINTON WILDER
CW STAFF

ATLANTA — In the capital of Dixie, MCI Communications Corp. Senior Vice-President Doug Maine emulated the fervor of a Southern evangelist in extolling information systems executives to take a larger, more active role in their companies.

At the recent Society for Information Management annual conference, Maine provoked a sizable audience of SIM members by ticking off areas where he believes IS has fallen short of management expectations — sometimes through the fault of senior management but more often because of the shortcomings of the IS profession itself.

SIM International

"Speak up!" said Maine, who handles financial operations and planning functions for the nation's No. 2 long-distance phone company. "You have been too reactive, too anxious to please. [Users] are not going to ask you what you think. You're going to have to extend yourselves."

Several SIM members took issue with Maine's comments, noting that in their organizations, it is the users' role to drive IS, with IS supporting the business functions. "There isn't a day that I don't come back with a work order from a user," one attendee said.

But Maine insisted that in the business world of the 1990s, IS executives must be a force for business change within their companies. "Lead the business, not vice versa," he said. "Your management teams don't know everything. Technology is so important to business strategy today, and you are the closest to that technology. You have to look for opportunities and make suggestions."

Maine also criticized academia for encouraging future IS employees to gain high-level technical skills in specialized areas rather than a broader understanding of hardware, telecommunications and applications. "You need all three to assume a leadership role," he said.

Maine suggested that users are often not a force for innovation in their organizations. "Users don't look for a lot of change," he said. "They like things the way they are. But IS doesn't necessarily have a vested interest in the status quo."

Ford Motor Co. IS executive Norman Lewis, another SIM conference speaker, said his IS organization has made the transition from support to change agent. "We're facilitating change, whereas our initial assignment was to get out of the way," said Lewis, director of North American systems at the giant auto maker. However, he admitted that "helping is not easy when [users] don't want to be helped."

Lewis detailed many changes that IS has effected in partnership with Ford business management but acknowledged that there are limits on how much change the corporate culture will accept.

"In manufacturing, they want to do it their own way, and they don't intend to change," he said. "We outlined a global computer-integrated manufacturing strategy but not specific actions."

MANAGEMENT BRIEFS

Papers sought for image conference

The Society for Imaging Science and Technology is seeking papers on computer imaging for its Third International Symposium on Image Conservation to be held June 17-20, 1990, in Rochester, N.Y. The symposium will focus on image deterioration, preserving specific images, current products for image conservation, standards development, restoration methods, problems posed by electronic images and environmental factors on image stability.

For more information on presenting a paper, send a short abstract by Nov. 15 to William E. Lee, 3 Woodland Circle, Rochester, N.Y. 14622.

Graphics and animation specialists are encouraged to enter the **National Computer Graphics Association's** 1990 International Computer Animation Competition, which honors the outstanding use of computer graphics in animation.

First-, second- and third-place winners will be selected in broadcast computer graphics, television commercials, corporate presentations, technology and computer graphics research and short films, videos and theatrical motion-picture computer graphics. Contest winners will be announced March 20, 1990, at the NCGA awards dinner in Anaheim, Calif.

Entries are due by Dec. 1. For more information, contact Tanya Bosse, competition coordinator, NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

The ISDN
Showcasing ISDN applications
BY JEAN S. BOZMAN
CW STAFF
SCOTTSDALE, Ariz. — AT&T last week drew major computer
its quest for MIS and
support for ISDN tech
After years of prep
able to showcase Int
Digital Network (ISDN)
equipment from such m
dors as Tandem Computers
Equipment Corp. and Wang L
Inc.
ISDN applications come alive at ICA
Dawn Bushaus, Assistant Editor
Vendors at the International Communica-
Association convention last week
ISDN STEALS SPOTLIGHT AT ICA SHOW
Twenty thousand people and more than 300 exhibitors are expected at the Dallas extravaganza April 30-May
AT&T To Let Telcos Offer Users Free ISDN
BY BETH SCHULTZ
SCOTTSDALE, ARIZ. — AT&T Net-
work Systems last week said it will give
its telephone company customers the
chance to provide their users with free
ISDN service on a trial basis.
AT&T introduced its Customer Oppor-
tunity Program at last week's NetPower
89 trade show here, which featured
AT&T central office equipment and third-
party supplied applications for integrated
services digital networks (Communica-
tionsWeek, March 13).
AT&T Network Systems' new pro-
An ISDN Opportun
EDITORIAL
AT&T, others offer we
of ISDN products at de
By John Cox
Senior Editor
SCOTTSDALE, Ariz. — AT&T last week demonstrated a battery of new and existing Integrated Services Digital Network prod
features such as Incoming Line Identification. Pric
$995, the product will be able in April.
ICA ISDN Demo: Ne
EDITORIAL
AT&T confirms, expands ISDN commitments
AT&T To Spotlight 11 ISDN Applic
BY BETH SCHULTZ
SCOTTSDALE, ARIZ. — AT&T Network Systems
plans to showcase 11 new ISDN applications for tele-
phone companies and business customers at the fifth
NetPower ISDN forum here this week, according to
NetPower '89—AT&T's semi-annual ISDN trade show.
Although '89 is the first time AT&T is the sole
sponsor of the NetPower forum, the company has
participated in the past two years. The forum is
designed to showcase AT&T central office equipment,
industry-specific networks and third-party products
with local telephone companies and business customers
using call-by-call services.
"This is a way to address [end users] directly," said
Robert Cooper, director of ISDN marketing at AT&T
Network Systems. "We will be demonstrating
applications that run from the PC [down into network]

NASIS change targets CIOs

BY MITCH BETTS
CW STAFF

The National Association for State Information Systems (NASIS), traditionally a mainframe-oriented group, plans a reorganization to broaden its focus and prevent the defection of chief information officers.

A final reorganization plan for the state government association will be produced at a Nov. 5 meeting of the executive committee in Austin, Texas, according to Richard A. Pierson, NASIS president and information processing coordinator in Rhode Island.

The changes will include the addition of committees to address CIO-oriented management issues, a new name and a broader scope. "We're going from what NASIS was 20 years ago, which was mainframe-oriented, to the entire information management and technology field," Pierson said.

The organization's new name will be the National Association of State Information Resource Executives, which is designed to reflect a focus on the broad discipline of information resources management. Administrative operations will be handled by the Council of State Governments in Lexington, Ky.

Prior to developing the reorganization plan, a group of CIOs in state government were planning to hold their own conference this month and form a splinter group, according to Michael Hale, executive administrator of Florida's Information Resources Management Commission.

State of dissatisfaction

Hale said some states were dissatisfied with NASIS, which focused on data center operations, and were looking for a forum to discuss issues such as policy, planning, budgeting, information management and "matching technology with the policy goals of the state."

The secession plans were halted, he said, when NASIS members voted at their annual meeting in August to proceed with the overhaul and provide a forum for CIOs. Pierson stressed that NASIS itself recognized that the change was needed. "We did this on our own. We knew we had to do it," he said.

The restructuring was plotted by a special committee chaired by past President Michael J. Durkin, director of planning and policy at the Virginia Department of Information Technology.

The membership vote was 33-to-1 for the overhaul, with the dissenting vote from Alabama. Rod Benton, acting director of data systems management at the Alabama Department of Finance, said he did not oppose the reorganization but protested the secretive way the reorganization committee performed its work.

Scorecard (Part 2)

Who's really putting ISDN on the map? If you've seen the headlines, you know the score.

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So, while most other suppliers are still in product development trials, AT&T Network Systems is helping phone companies across the nation offer Real-World ISDN services right now. Services such as simultaneous voice and data transmission, high-speed facsimile and electronic mail—all over a single phone line. Services that utilize your existing telephone network to dramatically increase productivity and efficiency for businesses, from hospitals and insurance companies to investment, publishing and law firms.

ISDN is just the beginning

We believe that ISDN is the beginning of an even bigger future. A future we call Universal Information Services. A future where networks will be able to meet complex communications needs for voice, data and image—simply and economically.

At AT&T Network Systems, this belief is already driving our technology, our product development, and our commitment to you.

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AT&T
The right choice.

Sounding the call for papers

Two user organizations have announced a call for papers for their spring 1990 conferences. Both groups are soliciting papers on a wide array of topics that address their respective interests.

The organizers of the Spring 1990 Digital Equipment Computer Users Society (DECUS) Symposium have announced the seventh annual Refereed Papers Competition. The competition will afford DECUS members an opportunity to present an in-depth discussion of the work they are performing using DEC equipment.

The conference will be held in New Orleans, May 7-11, 1990.

Papers should portray innovative work being performed by DECUS members in the computing arena. There are no restrictions on subjects or interest areas, but papers on the following topics are encouraged: managing the software development process; computer systems and network security; distributed applications and systems; transportable application environments; transaction processing and database systems; and knowledge-based and artificial intelligence applications.

Abstracts are due by Nov. 13. For more information, contact the Refereed Papers Committee, DECUS U.S. Chapter office, 219 Boston Post Road, Marlboro, Mass. 01752.

In a separate statement, the Usenix Association announced that it is seeking papers for the Usenix C++ Technical Conference to be held in San Francisco, April 9-11, 1990.

Papers for the conference can address any of the following topics dealing with C++: applications, libraries, new or improved implementations, programming environments and/or case studies.

Extended abstracts of two pages or less, or papers of 9-12 pages, must be received by Jan. 12. Authors will be notified of acceptance by Feb. 5 and must submit a full paper electronically and in camera-ready form by April 9.

The Usenix Association is a not-for-profit organization of people interested in Unix and Unix-like systems, including the latest developments in the C programming language.

For more information, contact Jim Waldo, CHR 03 DE, Apollo Computer, 300 Apollo Drive, Chelmsford, Mass. 01824.

Governing

CONTINUED FROM PAGE 79

says. "This way, you do more of your homework ahead of time. You minimize surprises."

Part of Tancredi's work as chairman of the IS management committee is to act as an intermediary between physicians and IS. "We needed a presence around the board to establish the credibility of the IS function," Tancredi says. "It didn't have the credibility in the institution that allowed them to go ahead and do things."

Menning, sounding like a Japanese-style manager, anticipates time lines nearly to the next generation. In the mid-1990s, Menning expects to have a common system available for the three Rochester hospitals' outpatients. But not until the turn of the century does he expect to have a common inpatient information system.

Despite the endless meetings, Menning adamantly believes that the Mayo Clinic is a place where he enjoys a remarkable amount of camaraderie, job satisfaction and purpose. He cites the minuscule 3% annual IS staff turnover as a prime example. "When you read about it, it's an intangible," he says, "but when you're here, you can almost touch it. It builds a sense of teamwork."

When applied to information systems, Menning says that the massive involvement of the physicians results in a better sharing of information — what's good and bad about any particular system.

In building new systems for combining all three hospitals, the IS staff formulates a set of common requirements for the basics of the systems. But when all these minds come together, there's another end product — ideas for efficiency within IS. "There's a net surplus of ideas," Menning says.

However, the plodding nature of management-by-committee can get in the way. "We can't act as timely as we'd like," Menning says.

> "COMMITTEES AND process are an integral part of the way Mayo functions, and IS is no different."
>
> WALTER MENNING
> MAYO CLINIC FOUNDATION

Menning has trudged through the mountains of meetings in order to get at basic design requirements and concepts for migrating the three Rochester hospitals to common applications, and he has some advice for other IS managers faced with a consensus management system.

"Don't avoid it," he says. "It's an opportunity to go into it prepared to inform as well as to understand more broadly the implications of systems [from users]. The effort may take longer, but the quality and end service will be better."

"Everyone concerned about ***Computer Connectivity*** *should go to the Invitational Computer Conferences."*

EDWARD COOPER
SENIOR DIRECTOR OF MARKETING
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For more information contact: Invitational Computer Conferences, a division of Dataquest, 3151 Airway Ave., C-2, Costa Mesa, CA 92626, Telephone: (714) 957-0171, Telex: 5101002189 ICCDQ, FAX: (714) 957-0903.

icc

CALENDAR

The "Managing Apple Computers in Information Systems (MACIS) Conference" slated for next month will feature a feedback session in which Apple Computer, Inc. will provide formal responses to issues raised by attendees at a previous MACIS conference.

The conference, scheduled for Nov. 5-8 in Dallas, will be based on the theme "Macintosh in the Executive Office." Speakers will include Richard Nolan, chairman and co-founder of Nolan, Norton & Co.; Alan Paller, president of AUI Data Graphics; and James C. Wetherbe, director of the MIS Research Center at the University of Minnesota.

The conference will feature sessions on management-related topics including security and training, future development of the new organization and solutions and applications for Macintosh technologies.

For more information, contact MACIS, Suite 600, 111 E. Wacker Drive, Chicago, Ill., 60601, or call 312-644-6610.

OCT. 15-21

Controlling Software Projects Management, Measurement and Estimation. Boston, Oct. 16-18 — Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Data Processing Management Association Computer Conference. Toronto, Oct. 16-18 — Contact: DPMA Toronto '89, 505 Busse Highway, Park Ridge, Ill. 60068.

Healthcare Computers & Communications. Chicago, Oct. 16-18 — Contact: Carol Every, Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

International Conference on Automation in Warehousing. Dallas, Oct. 16-18 — Contact: Institute of Industrial Engineers, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

National Educational Conference on Implementation and Use of Automated Geographic Information Systems. San Francisco, Oct. 16-18 — Contact: Ginger M. Juhl, Utility Graphics Consultants, Suite 222, 6200 S. Syracuse Way, Englewood, Colo. 80111.

Automatic Identification Manufacturers' Scan-Tech '89. San Jose, Calif., Oct. 16-19 — Contact: AIM, 1326 Freeport Road, Pittsburgh, Pa. 15238.

Educom '89: Information Technology in Higher Education from 1964 to 2014. Ann Arbor, Mich., Oct. 16-19 — Contact: Educom, P.O. Box 364, Princeton, N.J. 08540.

Software Maintenance Conference. Miami, Oct. 16-19 — Contact: The IEEE Computer Society, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036-1903.

Software Entrepreneurship Seminar. Orlando, Fla., Oct. 17 — Contact: Diana Dicks, Central Florida Council for High Technology, Inc., P.O. Box 4100, Orlando, Fla. 32802.

Canadian High Technology Show. Toronto, Oct. 17-18 — Contact: Canadian Standards Assoc., 178 Rexdale Blvd., Rexdale, Ont., Canada M9W 1R3.

Bizcom '89. Dallas, Oct. 17-19 — Contact: Bizcom Dallas, Registration Dept., c/o CMC, 200 Connecticut Ave., Norwalk, Conn. 06856.

Northcon Design-Oriented Electronics Engineering Exhibition. Portland, Ore., Oct. 17-19 — Contact: IEEE, 8110 Airport Blvd., Los Angeles 90045.

Supercomputing World. San Francisco, Calif., Oct. 17-20 — Contact: MG Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

Information Security Seminar for Business & Government. New York, Oct. 18 — Contact: Bill Kirby, ITT/USTS, 100 Plaza Drive, Secaucus, N.J. 07096.

Tape Storage Forum and Seminar. Sunnyvale, Calif, Oct. 18-19 — Contact: Technology Forums, Suite 260, 80 West 78th St., Chanhassen, Minn. 55317.

Conference on Fiber-Optics Markets. Newport, R.I., Oct. 18-20 — Contact: NCFM, KMI Corp., America's Cup Ave. at 31 Bridge St., Newport, R.I. 02840.

Institute for Information Management Network Capacity Planning Seminar. Washington, D.C., Oct. 18-20 — Contact: The Institute for Information Management, Inc., P.O. Box 361556, Milpitas, Calif. 95035.

The Road to Success. Los Angeles, Oct. 18-21 — Contact: Computer Dealers & Lessors Assoc., 1212 Potomac St. N.W., Washington, D.C. 20007.

Southeast Design Systems Conference & Exposition '89. Jacksonville, Fla., Oct. 19-20 — Contact: Elaine Elder, 1112 Third Street, Neptune Beach, Fla. 32233.

Focus '90: The Global Decade. Kansas City, Mo., Oct. 19-21 — Contact: The National Office Machine Dealers Association, 12411 Wornall Road, Kansas City, Mo. 64145.

Meeting of Computer Professionals for Social Responsibility. Washington, D.C., Oct. 20-21 — Contact: CPSR, Inc., P.O. Box 717, Palo Alto, Calif. 94301.

Amiexpo. Santa Clara, Calif., Oct. 20-22 — Contact: Amiexpo, Suite 301, 211 East 43rd St., New York, N.Y. 10017.

OCT. 22-27

American Bankers Association's Point of Sale Workshop. Dallas, Oct. 22-24 — Contact: ABA, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Executive Conference for Information Systems and Services. San Francisco, Oct. 23-25 — Contact: Input, 1280 Villa St., Mountain View, Calif. 94041.

Federal Computer and Defense & Government Computing, Graphics Conference. Washington, D.C., Oct. 23-25 — Contact: Jean Young, Young & Associates, 6187 Executive Blvd., Rockville, Md. 20852.

Hammer Forum '89. Boston, Oct. 23-25 — Contact: Hammer Forum '89, 5 Cambridge Center, Cambridge, Mass. 02142.

Hardware and Software Choices in the Open Market. San Francisco, Oct. 23-25 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Successful Acquisition of Competitor & Marketing Intelligence. Orlando, Fla., Oct. 23-25 — Contact: TMSA Seminars, Dept. SACMI, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510.

TelCon IX Teleconferencing Users Conference. San Jose, Calif., Oct. 23-25 — Contact: Applied Busines Telecommunications, Box 5106 San Ramon, Calif. 94583.

Solutions for Progress '89 Conference. Orlando, Fla., Oct. 23-27 — Contact: American Production and Inventory Control Society, Inc., 500 West Annandale Road, Falls Church, Va. 22046.

Strategic Management of Technology for the 1990s. Morristown, N.J., Oct. 24 — Contact: Diane Sotos, Battelle, 505 King Ave., Columbus, Ohio, 43201.

Distributed Database Conference. San Jose, Calif., Oct. 24-26 — Contact: David F. Codd, The Relational Institute, Suite 106, 6489 Camden Ave., San Jose, Calif. 95120.

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Packing your testing tool box

The right tools can speed software development and maintenance

BY BOB STAHL

Manually testing new software can breed more bugs than it catches, driving you and your data processing staff buggy in the process. Fearing the sting of such costly irritations, many organizations are looking at software testing tools.

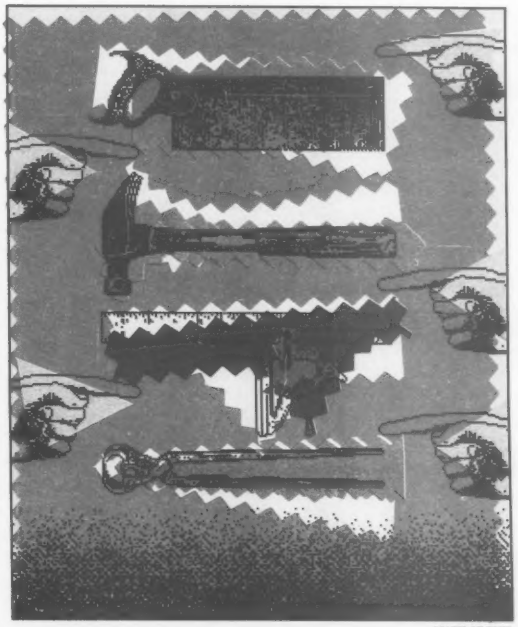
According to vendors, these software packages, which run on personal computers, minis and mainframes, can automate all or part of the testing process. Basically, the various tools can help determine whether code correctly transforms input data into the right output data.

IBM helped legitimize these products by including a software analysis test tool in its recent AD/Cycle announcement. According to IBM, the tool helps developers verify and validate software by providing test coverage measurement and analysis capability.

However, the sad truth is that software testing tools are an untried technology, vastly oversold by vendors. Organizations still buy them but are often disillusioned because they do not understand the tools or the key issues in software testing.

Before you shell out precious budget dollars, listen to Jeff Small, test manager at The Travelers Corp., whose Travtech subsidiary markets software testing tools.

"You can't buy your way out of trouble in software testing," Small warns. "All too often, six months after a tool is purchased it becomes 'shelfware.' You have to know what you're doing and have a sound testing methodology in place. Otherwise, tools just help you to do it wrong faster." For an overview of effective testing techniques, see "The ins and outs of software testing," [CW, Oct. 24, 1988].



MARK ULRICH

Still, software testing tools can relieve clerical burdens, reduce oversights, measure test effectiveness and support standardization — but only if you know what you are doing. A crucial first step is knowing the major classes of testing tools and the capabilities and limitations of each.

Automated regression testers (ART) are the most common software testing tools and perhaps the most useful.

Regression testing simply means saving the results of previous tests and rerunning them after a change is made to the system. The idea is to make sure that the change did not inadvertently break a working piece of code — a distinct possibility.

Regression testing is not just useful for maintenance, though. It is also essential for building a new system one piece at a time, as well as for porting systems to new hardware.

ARTs store the inputs and expected outputs of a series of tests. Inputs are automatically played back to the computer, and outputs are compared with expected results. Tests that result in a mismatch fail and are logged. In the process, clerical labor can be greatly reduced. In fact, some consultants recommend that anyone engaged in serious software testing should have an ART. Popular packages include Traps by Travtech, Autotest by Software Recording and Sterling Software and Smarts/Capbak by Software Research.

ART lessons

The hidden problem in regression testing is managing the ballooning set of regression tests. After six months of using ARTs, an organization can have thousands of regression tests stored in files.

Files are too numerous to run each time a change is made. Furthermore, nobody knows which tests apply to what part of the system, which are redundant (because they test the same path) and which are obsolete. To the discouraged, it often seems easier to start over rather than to sort things out, although this obviously would waste the enormous effort spent building the tests.

There are two solutions: One is to embed the test cases in a database, which is then used to feed the ART. Test cases can be tagged with a text field describing which functional parts of the system they test. Cases can then be easily searched for, edited or deleted.

Another approach is to use a commercial product, such as Transfixxer from Marble Software. According to the vendor, Transfixxer compresses test sets by actually running the tests, looking at the path segments traversed and flagging redundant test cases for deletion. One insurance company compressed 60,000 tests and found

Stahl is president of The Interface Design Group in Petaluma, Calif., which provides training in software testing techniques.

- **Realistic expectations are key**
- **Different tools for different jobs**
- **To avoid 'shelfware,' learn proper use**

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2962

that only 18 were needed to do the same job. With a reduction of this magnitude, many test-set management problems dissolve. The first axiom of testing comes into play: "If it's small enough, anything will work."

Such off-the-shelf solutions are limited, though. For example, Transfixxer works only for Cobol. Some users describe it as awkward, though effective. One solution is to rewrite or streamline the program.

Coverage analyzers

Coverage analyzers are a genuinely useful tool. They tell you which parts of the code have been executed by a test. They also produce cumulative totals of the percentage of the code that has been executed by a series of tests.

Coverage analyzers work by examining the source code ("static analysis") and inserting extra statements that allow the analyzer to detect when this code is executed. A new set of source code ("instrumented code") is produced.

Tests are run using the instrumented code, which executes slowly but produces listings showing which sections have not yet been executed. Many installations have testing standards such as "85% of the code will be covered." In practice, it is difficult to achieve 100% coverage, because it is too time-consuming to construct tests that exercise and check every tiny portion of code.

Coverage analyzers are useful, but their results can be misinterpreted. "Covering" code is not the same as testing it.

One manager at a software development house learned this the hard way. "We had a very buggy release which hurt sales and cost some people their jobs," he recalled. In the aftermath, there were some unpleasant meetings in which top management kept shouting, 'You people assured me this was completely tested!' It turned out that the code was completely *covered* — and neither management nor the people doing the testing understood the difference. We do now."

To understand the problem, visualize a flowchart of your system. The flowchart is composed of a series of path segments. Each segment is a stretch of code between two decision points (such as IF statements). Once the program enters a segment, it will execute all of the segment, since there is no way out. Therefore, we can think about coverage in terms of segments instead of worrying about individual lines of code.

Now imagine the flowchart to be a set of ski trails. A skier enters at the top and tries to cover as many segments as he can before exiting at the bottom. On each successive run, the skier adds new path segments to his list. With very few runs (test case runs), most of the segments have been covered. Yet we know almost nothing about how the program will work.

That's because each execution of the program will execute a path, which is a sequence of segments in a particular order. There are many ways to combine segments into paths. And coverage says nothing about these combinations.

Suppose Segment A erases a file that is later needed by Segment X. Segment A works, and Segment X works — except when Segment A has been executed first. Unless the test case happened to include Segment A followed by Segment X, we won't find this problem or others like it.

Clearly, coverage is a very low hurdle for a program to clear. Nevertheless, it is helpful to know which parts of the code execute at all, and a coverage analyzer is well worth the modest investment.

A tip: Make sure your salesperson understands the difference between a path and a path segment. Similarly, beware of a vendor claim that you need the product because "It's important to know how much testing is enough." It is important, but a coverage analyzer won't tell you.

Test case generators

The good news is that test case generators tackle the central issue of testing — deciding what the test cases should be. The bad news is that they are still in their infancy and are, at best, incomplete.

The usual approach is to put tests into a highly structured form and analyze them, usually with the help of a PC.

At the core is a technique called Cause and Effect Graphing, which performs Boolean logic on the requirements' objects and the relationships between them. A list of test cases is produced, along with a list of errors resulting from inconsistencies in the requirements.

There are several problems with this approach. First, the process of translating the requirements into the rigid syntax required by the computer is painstaking and subject to error. You must essentially respecify the system in another language, and the results will be no better than the accuracy of doing this. Errors will produce faulty test case design.

Second, the only tests generated will be for the internal logic of the requirements. Practical applications run up

Continued on page 89

Before you test . . .

You are more likely to succeed in using software testing tools if you understand a few basic truths before starting out.

- **Be realistic.** Testing tools are an immature technology, created to meet the recent surge of interest in software testing. Neither the buyers nor the sellers of such tools have a lot of experience with them. A firm grasp of testing techniques is essential to understand what tools can and can't do for you.
- **Understand limitations.** There is no such thing as perfectly tested software. Even a small piece of real code software has uncountable billions of possible combinations of input. Such software operates in a complex environment of databases, operating systems, communications and hardware. Expecting that everything will work properly in all possible circumstances is unrealistic, with or without tools.

As a result, the best that developers can hope to do is reduce the probability of serious problems to an acceptable level, as efficiently as possible. It is here that the right testing tools can help.

- **Start with the right environment.** Testing software in an uncontrolled environment is like trying to play pool on the deck of a pitching ship; you can't play on a moving field.

Fortunately, the most important testing tools are found in most good development environments and seldom need to be purchased. These include a data dictionary, module dependency lists (which call and are called by other modules) and procedures for tight version control. Such tools provide an orderly, structured environment in which data and code dependencies are known and documented.

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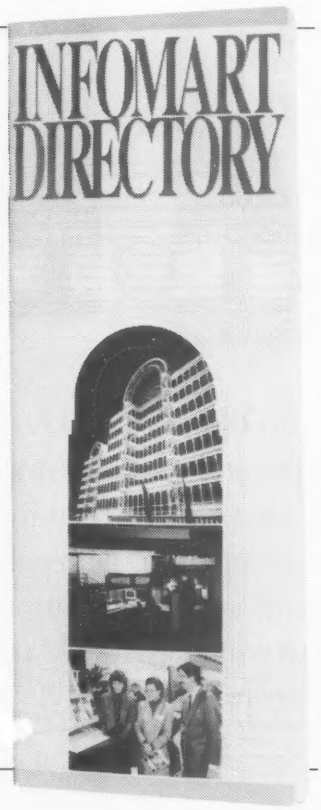

Software testing tools at a glance

Found tools
- Provide orderly testing environment.
- Generally included with operating systems.

Random data generators
- Generate arbitrary test data.
- Most valuable for performing simulations.

Test case generators
- Analyze highly structured requirements.
- Most valuable for performing simulations.

Complexity analyzers
- Examine source code and rate complexity.
- Useful in maintaining long-term health of system.

Coverage analyzers
- Show which parts of code have been executed by test.
- Useful in showing which parts of code are executable.

Regression testers
- Save the results of previous tests to ensure quality control.
- Valuable for new systems, maintenance and ports.

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Software converts TRW testing manager

BY JOSEPH MAGLITTA

John Krueger and his software testing team at TRW's Space and Defense Sector in Rendondo Beach, Calif., knew they had their hands full even before they touched the first piece of code.

Their mission: a three-year project to port a massive, companywide financial and numerical database from IBM's IMS to Cullinet Software, Inc.'s IDMS.

It promised to be a testing nightmare: Each regression test would have to be painstakingly keyed, then manually run by the half-dozen testers involved in the process.

Like many companies, TRW was under pressure to produce software as quickly as possible. As assistant project manager of the testing program, Krueger shuddered. "The system was all on-line," he recalls. "We knew that we needed a tool that would allow us to test more easily."

USERS BEGAN TO recognize distinct advantages to using a regression tester. It enabled them to create a catalog of testing functions, thereby eliminating duplication of effort.

So early last year, Krueger set out to find a testing tool that could speed up the process.

In April, after shopping around, he settled on Autotest, a personal computer-based testing tool sold by Sterling Software in Rancho Cordova, Calif. Krueger plunked down $3,700 each for five copies and then headed back to the test lab.

Users came up to speed in a day or so, Krueger says, learning enough basic functions to get the package running. "We probably required additional training," he says.

Smoothing the bumps

Initially, a small problem arose when the PC-based package could not be fully integrated with IDMS. By far, the hardest, most tedious part of the work was designing the actual tests that would run on the IBM Personal Computer AT systems, Krueger says.

Before testing could begin, he explains, each test case had to be designed in painstaking detail to ensure that the code would run on the IBM mainframes where the databases resided. The team needed to develop test case scripts, which would then be run through Autotest.

Early on, the seven-member team had developed run functions, printout screens and other details. "It was as much work as developing the system," he says. It was in the up-front work, Krueger admits, that his team could have done a bit better.

"We had spent a lot of time outlining test conditions. Unfortunately, we didn't end up using them at all. Part of the problems arose because some of the original test case development was done in Multimate files, which could not easily be converted to the new system by the novice users," Krueger says. "We weren't familiar enough with it."

Even so, the team forged on, enlisting the help of users to do scenario testing.

Fortunately, TRW testers were able to avoid a common complaint of regression testers: the need to babysit the package.

While some commercial packages required operator presence, Krueger says Autotest could run on two or three PCs at once, with only one person monitoring it.

Users began to recognize distinct advantages to using a regression tester. It enabled them to create a catalog of testing functions, thereby eliminating duplication of effort, Krueger says.

More important, it helped speed up application development. "We could run tests quickly and get results back to the developers the same day, rather than having them wait around," Krueger explains.

Although the IMS-IDMS conversion project was eventually cut short by TRW, Krueger, now a TRW communications resource manager, saw enough to sell him on the value of the tools.

"We would not have been able to meet our projections without it," he says. "We were very pleased with what we accomplished with it."

All told, he estimates that the division saved about $200,000 by using the regression tester — the cost it would have taken to manually key each regression test.

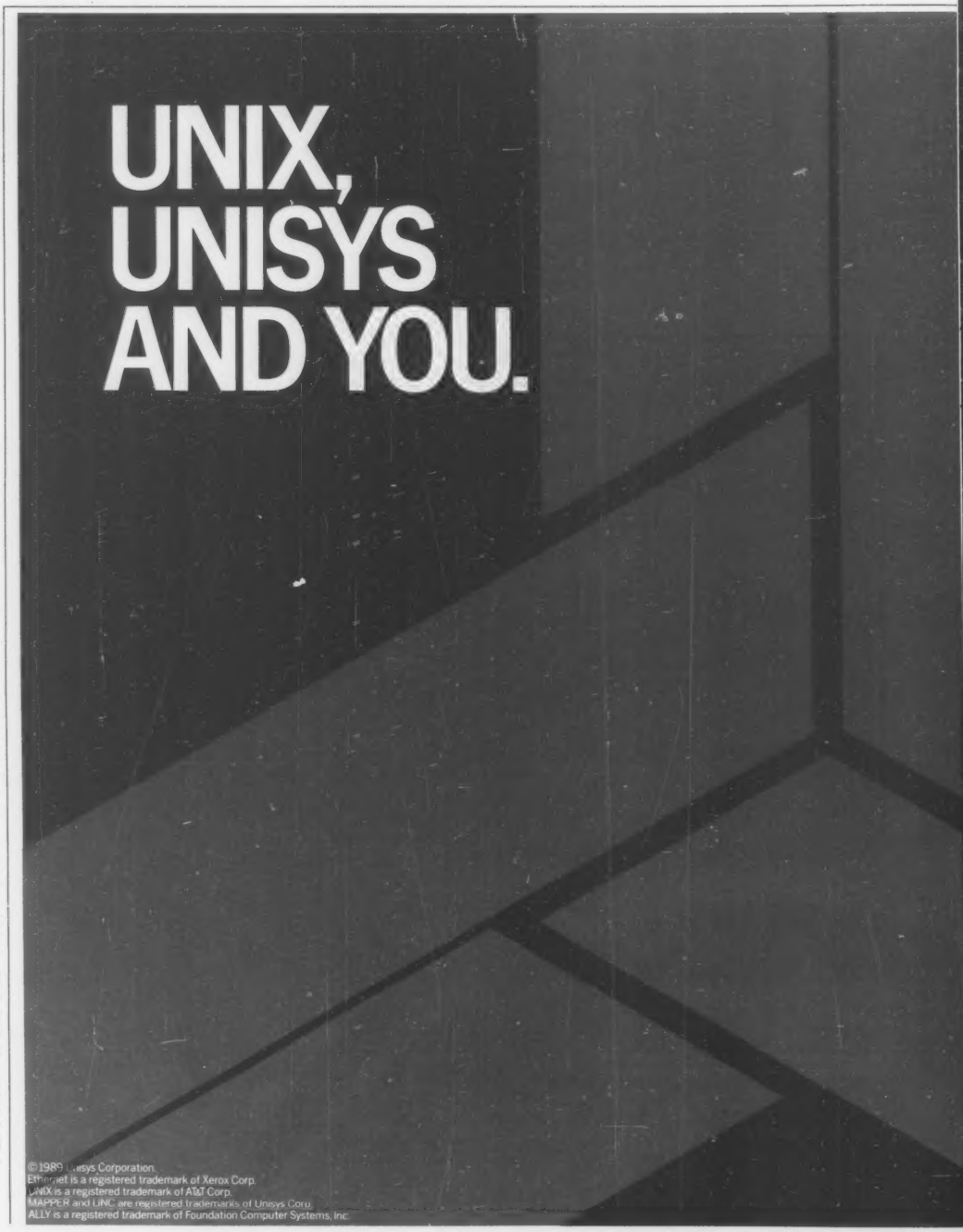
That tool also yielded substantial savings, he says.

His advice to potential users of software testing tools: Be committed. "You've got to be willing to make the investment in developing the tests."

He estimates that his own group devoted between 10 and 14 systems-months to developing tests.

It is also important to understand the limitations of regression testers, Krueger adds. "This is not a debugger." •

Maglitta is a *Computerworld* senior editor, In-Depth.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Tool box

CONTINUED FROM PAGE 85

against programming flukes, incomplete data tables and interaction with other parts of the system. No tests are generated for these conditions.

"We tried a test case generator and it produced thousands of test cases," recalled a software tester at a major West Coast defense contractor. "The problem was that the cases were very abstract. And it wasn't clear what they corresponded to in the real world, so we examined each one by hand. It turned out that over half the test cases were physically impossible things, such as voltage coming out of a device that wasn't plugged in. Since the product was also hard to use, we decided that it made more work than it saved."

The bottom line is that right now, these products are most useful when your requirements involve complex "if-then" logic and when you want to check for internal consistency.

Random data generators

Random data generators produce random test data within specified ranges. The word "random" can be misleading, however. There are billions of combinations of valid data, and most of them will exercise the same parts of the program. Furthermore, someone must supply the correct answer for each test.

The best use of random test data generators is for performing software simulations. For example, if your system involves real-time processing and multiple users accessing a database or operating system module in real time, you can simulate this situation with phantom terminals conducting random operations.

This approach abandons the concept of checking for correct results. Instead, it tries only to strain the system to see if anything breaks. If a break occurs, the reason is often difficult to determine, since the complex series of events that caused the problem is not known.

Complexity analyzers examine source code and calculate a complexity metric — a number designed to grade the complexity of the code by counting branches, loops and other structural elements.

However, there is no general agreement on what recipe should be used for the metric: One product offers you a choice of more than 100 different metrics.

More important, users must ask what they would do with the information if it were available. Metrics are computed by testing tools largely because they are easy to compute.

The real value of metrics is in maintaining the long-term health of a system. For example, you could decide that maintenance changes cannot make code more complex as measured by the metric. In testing, however, it is harder to think of a good use for complexity analyzers. Thus, it's probably a good idea to limit their use to maintenance functions.

One vendor offered this advice: "Know the mechanics of testing inside out before you look at tools. Then use the 30-day trial period most vendors offer you. Many sites waste this period 'becoming familiar' with the tool. Do that first, and use the trial period to try it out on your own production work."

Used properly, software testing tools can automate testing techniques, reduce bugs and better utilize staff time. Success depends on having realistic expectations, choosing the right tools and mastering the techniques of each package. •

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Regression tester buying tips

Automated regression testers are becoming popular software testing tools. Although the differences between these products are more minor than the vendors like to admit, it's important to know what attributes to look at when shopping around.

- **Flexibility vs. ease of use.** For example, Autotest is generally regarded as being more flexible than Traps, but it has a somewhat steeper learning curve.
- **Adaptability.** A more serious concern is how well the ART handles bumps in the road. Suppose a new system message, requiring a yes/no response, is added to the system. Will this cause all the succeeding tests in the test set to fail, because the canned responses are now off by one keystroke? Or will the ART prevent the change from running on into new tests?
- **Timing.** If the ART plays the input keystrokes back as fast as it can, will this outrun the program and result in lost keystrokes? Some products provide various playback speeds, including a "faithful" mode that replays keystrokes at the same speed at which they were recorded.

However, on multiuser systems, even this speed may be too fast if the keystrokes are recorded at a time when the system is lightly loaded and playback occurs when it is bogged down.

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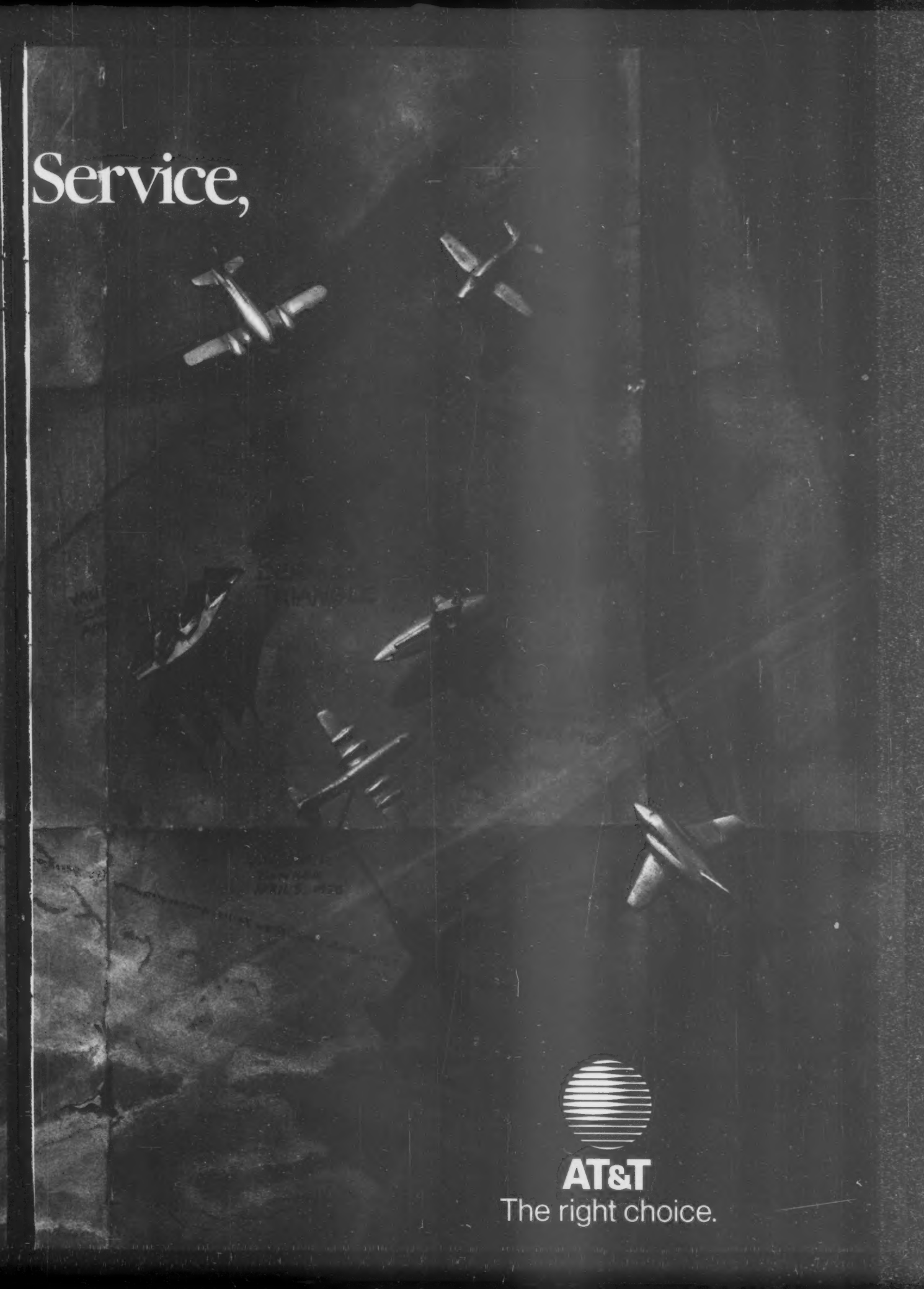
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* The Wall Street Journal (1987) — "Survey of the Information Processing Marketplace."
* The Adams Co. (1988) — "Information Systems Management Study."

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COMPUTERWORLD
INSIDE
Product Spotlight — MIS dabbles in electronic
Court: States may tax net traffic
BY MITCH BETTS
WASHINGTON, D.C. — A U.S. Supreme Court ruling last week
use transaction networks such as airline reservation systems, may wind up moving their data centers to "tax haven" states that do not impose telecommunications taxes, according to experts.
"This will definitely affect site-location decisions," said Kenneth L. Phillips, vice-president of telecommunications policy at Citicorp in New York and chairman of the Committee of
Continued on page 16
On SQL Server's test trail
BY DOUGLAS BARNEY
A glaring shortage of front-end

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Peter Bartolik

Castles built on sand

The capital gains tax cut proposal passed by the U.S. House of Representatives *should* serve to replenish venture capital funds and improve the climate for initial public offerings. So, if the Senate bows to the wind, the computer industry should be lapping at the gravy bowl, right? Maybe.

Cuts in the capital gains tax were widely believed to spur manic investment in computer industry start-ups in the mid-1980s. It's possible that as investors cash in their long-term investments to take advantage of a short-term reduction in taxes, some of that money is going to end up coming our way.

That may make for wild and crazy days during the next two years, with paper millionaires sprouting up as Wall Street embarks on a next-generation search for the quick buck.

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Inside

- Ask Computer Corp.'s founder is back. Page 97.
- Benefits of research and development tax credits are modest. Page 100.

Firms wield pruning shears

Industry mighty oaks are bending to the cruel winds of changing times

BY RICHARD PASTORE
CW STAFF

As if taking their cue from the season, major industry players are shedding employees like maple trees shed leaves in the fall. Most recently, IBM, Unisys Corp. and Motorola, Inc. have joined the thicket of firms offering employees voluntary severance incentives — as well as the ax — in order to prune operating costs.

In the case of Unisys, the firm launched a long-expected layoff process that will affect 3,200 workers in the short term and as many as 8,000 in total.

This staff shakeout trend is being driven both by a softening market and an evolving manufacturing process, according to analysts. Because hardware systems are using fewer and smaller CPU boards, the manufacturing process is becoming much less labor-intensive, analysts said.

"There is less manufacturing talent needed across the board," said Byron Walker, an analyst at Moody's Investors Service in New York.

In recent weeks, companies announcing plans to eliminate a significant number of positions have included Wang Laboratories, Inc., Novell, Inc., Control Data Corp. and even holdout Digital Equipment Corp., which last month made a severance offer that it hopes will weed out at least 700 employees [CW, Sept. 25].

In one of the broadest cuts, Unisys began a round of layoffs last week that will affect 3,200 workers at 250 U.S. sites. Part of a restructuring plan intended to cut costs by $400 million to $500 million, the layoffs will be extended through the end of 1990 and will ultimately eliminate about 8% of Unisys' work force.

Even given the cash flow and financial pressures that now burden Unisys, the plan is dramatic because of its magnitude, said Michael Geran, an analyst at Nikko Securities Co. International "The question that remains is, have they cut into the muscle?" Geran said, pointing to the large number of employees affected.

The layoffs, coupled with consolidation of manufacturing facilities, will increase Unisys' revenue per employee from

Continued on page 96

Problems continue to pile up at Datapoint

BY PATRICIA KEEFE
CW STAFF

SAN ANTONIO — It's got to be trying times down on the Texas range for Datapoint Corp., which is besieged by a tenacious challenge to its management, financial problems and uncertainty over the future of its flagship technology.

In a published interview in March regarding efforts to reposition the communications supplier, then-President Robert Potter said Datapoint had to respond to the customer first and to everything else second.

These days, however, it seems customers will have to fight their way through the stack of woes hovering like hungry wolves at Datapoint's doorstep.

At first glance, Datapoint appears to have almost hauled itself out of the rut in which it languished for the first half of the decade. After a hostile takeover engineered by raider and current Chairman Asher Edelman in 1985, Datapoint managed to fend off his efforts to take the company private while racking up profits in seven out of eight quarters. Then came the dog days of the summer of 1989.

First, Datapoint bid adieu to its third president in five years, welcoming No. 4, Michael Michigami, on board Aug. 14.

Then, the creators of Arcnet network technology wowed the critics by pulling a 20M-bit version of its trademark technology out of an aging hat amid much fanfare.

However, given that Datapoint's Arcnet has long since missed the standards boat, it is debatable how much pull it retains in key corporate accounts.

Next, the tables were turned on Edelman, who is busy fending off a challenge from an irate stockholder seeking to overthrow Datapoint's board and Edelman with it [CW, Sept. 25].

Continued on page 101

Home on the range

Maybe it *used* to be that seldom was heard a discouraging word and the skies were not cloudy all day. Recently, however, woes have been accumulating at the door of Datapoint's home on the range. Among them are the following:

- A $29 million net loss for the fiscal year ended July 29.
- A stockholder suit filed against Datapoint, Chairman Asher Edelman and several other named parties.
- A stockholder seeks to unseat Edelman.

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The Digital Standard

The creator of the AS/400 left a few things out.

Once again, it took IDEA to complete the picture.

Ask IBM about the connectivity capabilities of the AS/400 and they'll say they've got all the pieces put together.

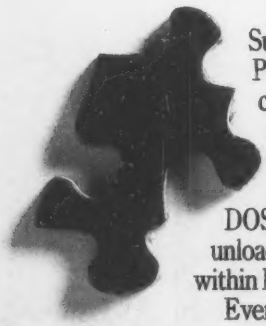
Sure, they've integrated PC Support into the host system, but upon closer inspection, you'll see there are a few details that Big Blue has overlooked.

Diminished host performance.

With PC and PS/2 users connected to the AS/400 via PC Support, you may discover you'll require a larger CPU or a second one just to handle your basic computing needs.

Running PC Support on the AS/400 consumes a lot of expensive host resources – at least 300-500K of host memory per user. And that's probably enough to bog down the host and make it unable to process data at the pace your organization needs it.

PC memory loss.



By accessing the AS/400 via PC Support or a Token Ring connection, your PC doesn't have enough memory left to concurrently run the PC applications it was designed for. The combined functions of PC Support take up more than the 640K memory allotted by DOS. Which means you'll be loading and unloading PC software applications to stay within DOS.

Eventually, a PS/2 running OS/2 may solve this memory consumption problem, but can you afford to replace all your existing workstations?

Feature limitations.

To make matters worse, PC Support restricts your terminal and printer emulation options. It doesn't offer Model 3180 emulation, so you can't work in 132 column documents. There's no Model 4214 printer emulation. And you'll find PC Support is pre-configured for IBM PC printers only. Configuring your third-party equipment will cost you time, money and aggravation.

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IN BRIEF

Tarnished quarters

Sun Microsystems, Inc. expects to break even in the third quarter on revenue of more than $530 million. The workstation leader lost $20 million in the last quarter on revenue of $431 million. Word processing software maker Interleaf, Inc. is not even that lucky — it expects a loss of $1 million for the quarter, compared with a profit of $123,000 in the like quarter last year. Publishing software vendor Xyvision, Inc. promised a "significant" loss for the third quarter and layoffs of 80 employees.

On better terms

Just days after quashing a proposed merger with **H&R Block, Inc.** over irreconcilable terms, **Microbilt Corp.** announced its intent to be acquired by First Financial Management Corp. (FFM). FFM will pay Microbilt shareholders slightly less than half a share of FFM stock for each share of Microbilt stock.

Closeout sale

Control Data Corp. last week closed the sale of its **Imprimis Technology, Inc.** data storage subsidiary to **Seagate Technology, Inc.** CDC will net $250 million in cash, 10.7 million shares of Seagate stock and a $50 million promissory note.

Going American

Hitachi America Ltd., demonstrating its commitment to Americanize its U.S. operations, named Doylestown, Pa., native William Gsand as executive vice-president. Gsand joined Hitachi in 1986 as vice-president of marketing and sales in the semiconductor division.

Heading Rolm

Last week marked the official opening of The Rolm Company as a jointly owned **IBM/Siemens AG** marketing and service organization. Taking the helm at Rolm is former IBM Vice-President of Marketing and Service **H. Mitchell Watson Jr.**

Capital gains

Colorado Springs-based computer leasing player **Capital Associates, Inc.** made a quantum move last week into the worldwide presence it seeks. Capital inked a joint venture agreement with Japanese leasing company **Central Leasing Company Ltd.** and Japanese venture capital company **Nippon Investment & Finance Co.** aimed at establishing a Japan-based computer leasing and resale company that will operate throughout Asia.

Pruning

CONTINUED FROM PAGE 93

$119,000 to $131,000, Geran estimated. Provided that revenue growth runs 3% to 5% next year, the restructuring "should allow Unisys to return to profitability in 1990," he said.

IBM joined the autumnal procession late last month, offering selected employees one week of severance pay for each six-month period they have worked for the company. An IBM spokesman said the firm expects 600 to 1,000 of its 223,000 U.S. workers to accept the offer.

Financial analysts, who were stunned by IBM's recent announcement of lower-than-expected third-quarter earnings, said the plan does not go far enough.

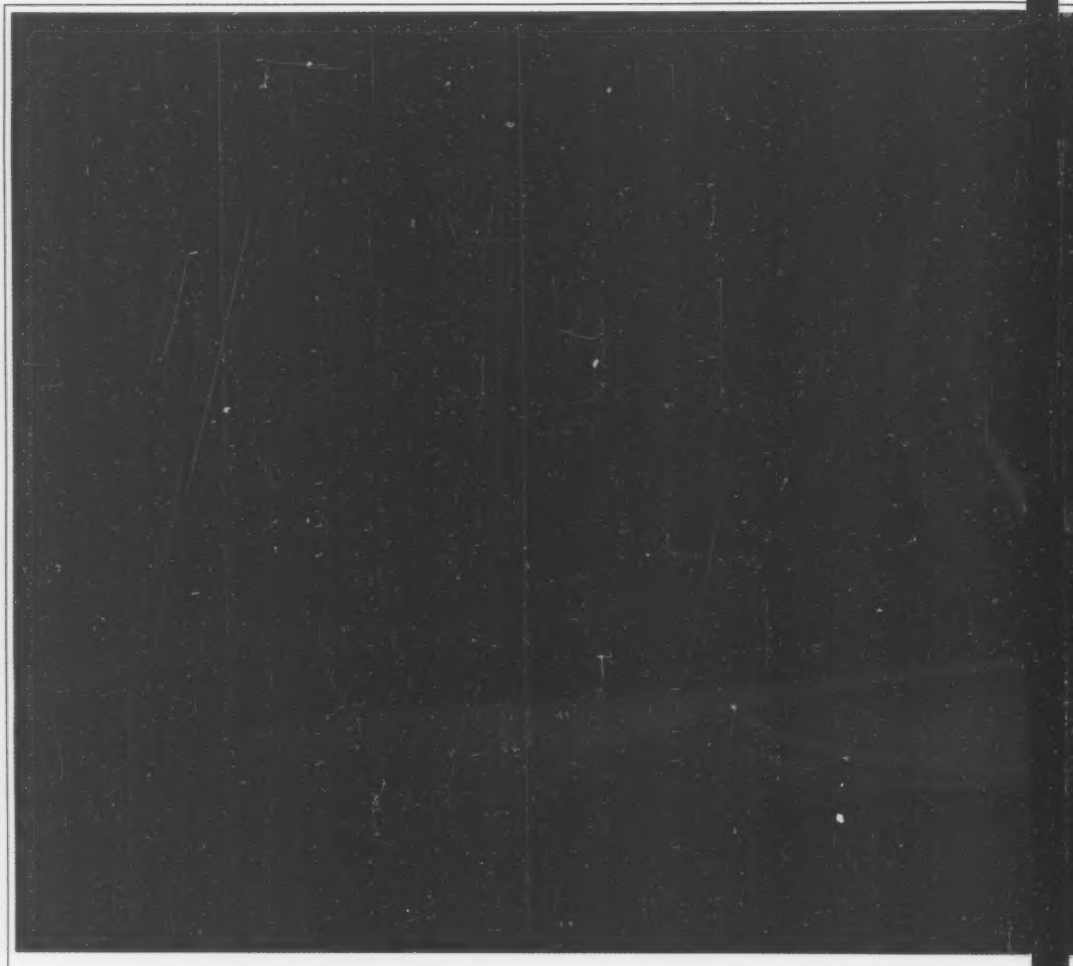
"This little move does not count," said David Wu, an analyst at S. G. Warburg & Co. in New York. IBM's reorganization efforts in the past two years, including two previous early-retirement plans that have reduced its roll call by more than 18,000, have not been enough to make the company "more competitive and fast on its feet," Wu said.

The latest incentive plan is being offered to administrative support staff of all levels at plants in Manassas, Va., and Owego, N.Y., which produce equipment for defense contracts; Endicott, N.Y., which manufactures the 9370 minicomputer line; and Lexington, Ky., which produces printers and typewriters, an IBM spokesman said.

Motorola last week joined the crowd of companies making cuts. The firm announced that it hopes to entice some 2,500 of its 105,000 worldwide employees to accept a severance offer that would pay them two week's salary for every year of service.

The plan will primarily affect employees in Motorola's semiconductor and electronic communications sectors and possibly a few in its computer group.

The move is part of a restructuring effort to cut costs in slower-growing areas such as semiconductors and shift resources to the cellular communications sector — a market now growing about 100% a year, according to Drew Peck, an analyst at Donaldson, Lufkin & Jenrette in New York.



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Kurtzig startles industry with return to Ask

BY J. A. SAVAGE
CW STAFF

Only seven months after Ask Computer Systems, Inc. Chief Executive Officer Sandra Kurtzig officially left the company she founded, she is back.

Kurtzig said her return was prompted by a request from Ask's board of directors. "I had a vision for the company, and the board requested that I come back," she said. She added that the "vision," which she would not explain, has yet to be accepted throughout the company, but it should be worked out in the next few months.

Analysts had trouble divining why Kurtzig returned. Ask, which sells manufacturing systems based on Hewlett-Packard Co., Digital Equipment Corp. and IBM platforms, has been profitable but has experienced growing pains with last month's acquisition of Data 3 Systems, which makes products for the IBM Application System/400 market.

Analysts said Kurtzig's return may be incidental to the company's problems but that it may not be a good sign.

"Founders returning are not very good for big companies — and Ask is in the big leagues now," said David Wu, an analyst at S. G. Warburg & Co. "The fact that she built a house in Hawaii and her kids are teenagers and not around as much and she's bored doesn't mean she should come back to the company. [Ask] is not her playpen."

Kurtzig left earlier this year to write an autobiographical book and pursue life in general without the company she founded 17 years ago. She denied that boredom had anything to do with her return. But she did joke that the house in Hawaii was finished and there was not much left to do.

"The company itself is trying to figure out what it is and where it's going," said Bill McSpadden, president of Plant-Wide Research Group in North Billerica, Mass.

Kurtzig *rejoins Ask in midst of marketing push*

He said that as manufacturing systems are being based on smaller platforms, vendors' margins are eroding, and Ask itself is losing territory.

Kurtzig's current dilemma is marketing to IBM users. By itself, Data 3 had no marketing strength, McSpadden said. Kurtzig said she is arming herself with new white shirts and dragging a couple of dark blue suits out of her closet.

"Realistically, 50% of the [manufacturing] market has blue undershorts. Those people are going to buy IBM whether we have the best software [on other platforms]," she said.

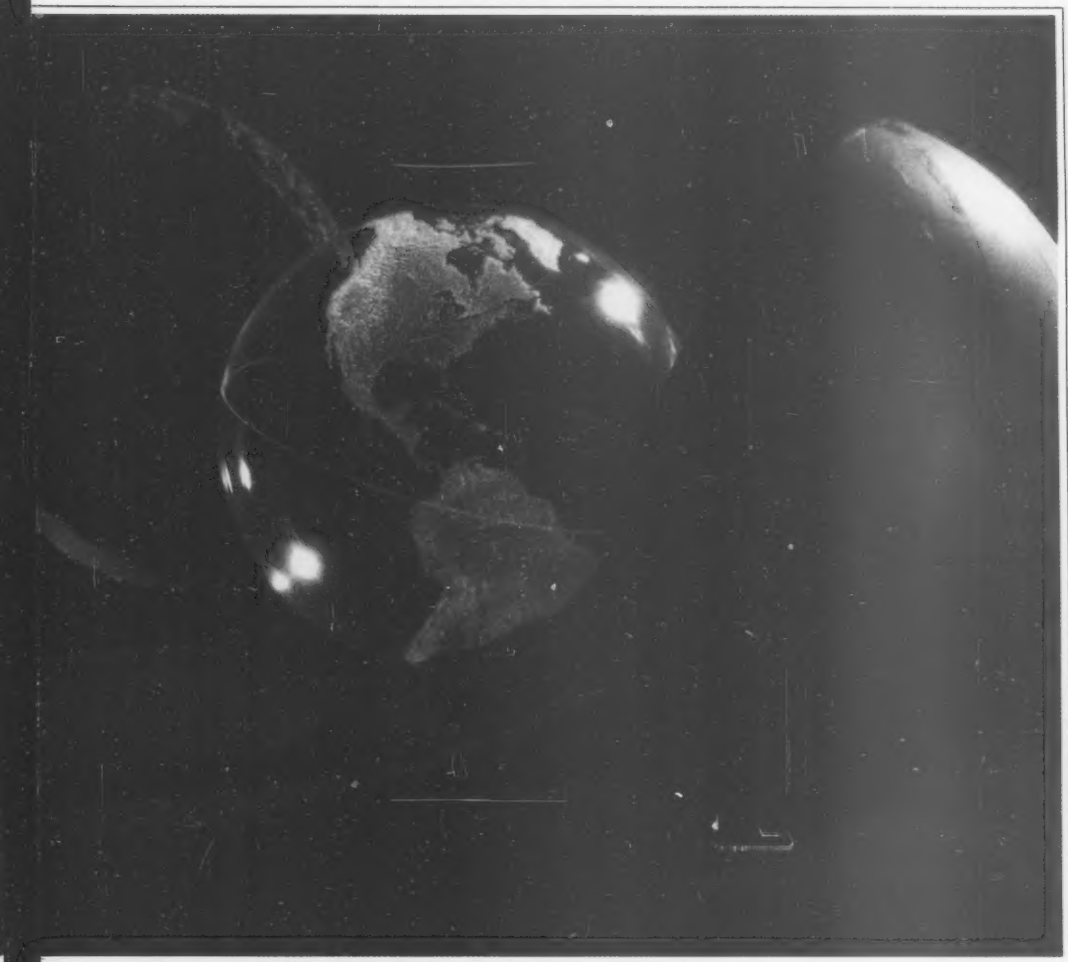
EXECUTIVE CORNER

Ingram Micro D, Inc. has announced the appointment of **David R. Dukes** to president and chief operating officer. Dukes, a 10-year industry veteran, has served as regional president of **Inacomp Computer Centers** for the past three years. He will be responsible for all domestic sales, marketing, operations, IS, product acquisition, technical products and mass markets and will play a major role as the firm moves more into advanced technical markets. The firm serves as a wholesale distributor of microcomputer products to over 30,000 reseller customers in the U.S. and Canada. It expects 1989 revenue of $1 billion.

Randy N. Phillips has been named president and chief executive officer of **Racal Interlan,** a major supplier of local-area networking products. Phillips, an industry veteran whose previous posts included IBM's Rolm Systems, AT&T, GTE Corp., RCA Corp. and the U.S. government, has also served as president and general manager of the Datacom division of Inmac, Inc.

As part of an overall strategic corporate reorganization, **Landmark Systems Corp.** President and CEO **Patrick H. McGettigan** was named chairman and CEO, with responsibility for strategic directions, product futures and industry relationships. Reporting to McGettigan is **Jeffrey H. Bergman,** now president and COO. Formerly senior vice-president of sales and marketing, Bergman assumes responsibility for all day-to-day operations of the corporation.

Hitachi America Ltd. — demonstrating its commitment to Americanize its U.S. operations — named Doylestown, Pa., native William Gsand as executive vice-president. Gsand joined Hitachi in 1986 as vice-president of marketing and sales in the semiconductor division.



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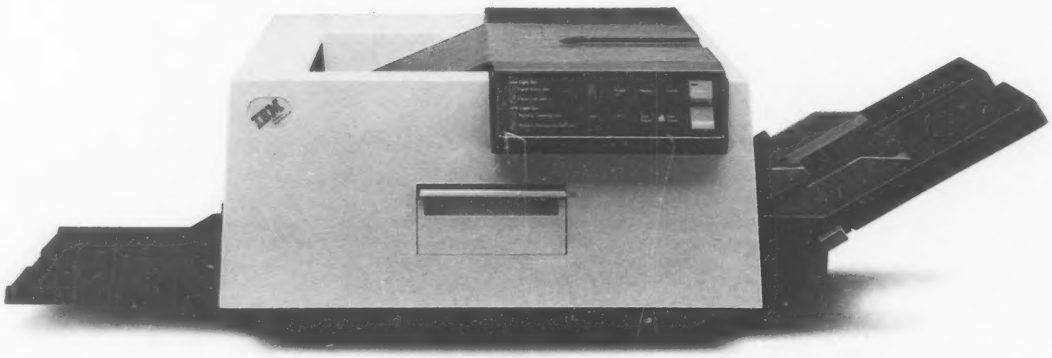

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Tax credit benefits in question as GAO sees modest returns

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The federal tax credit for research and development expenditures — a favorite of the computer industry — stimulated between $1 billion and $2.5 billion of additional research from 1981 through 1985 at a cost of $7 billion, according to a government audit.

In other words, the tax credit increased research by 15 to 36 cents for every dollar of tax revenue foregone, said the study by the U.S. General Accounting Office (GAO).

The effectiveness of the credit looks pretty modest, but the GAO said the dollar figures do not take into account any additional benefits to society produced by this research. "If — as many [economists] presume — research activities are more beneficial to society than nonresearch activities, the credit may still be sound tax policy," the GAO concluded.

The GAO added that it did not study whether other forms of government incentives, such as direct funding, would have been more effective. The tax credit "is basically a transfer of money from all taxpayers to those taxpayers who exceed their base research spending," the report explained.

From a survey of Internal Revenue Service auditors, the GAO concluded that the research credit was relatively difficult for the IRS to administer because the definition of qualified research expenses was unclear.

IRS auditors frequently challenged the amounts that corporations claimed as qualified research expenses. The IRS audited an estimated 74% of the large corporations that claimed the credit and, on average, cut each corporation's claimed research credit by about $1 million.

The GAO survey showed that the disputes often focused on whether the credit should be allowed for the following types of expenditures:

- Adapting an existing capability, such as computer software, to meet a particular customer's needs.
- Routine or cosmetic improvements in existing products or operations.
- Overhead and administrative expenses related to research.
- Ordinary testing of products and market research.
- Research funded by the government.

The heaviest users of the credit are large manufacturing companies, the GAO reported.

Bartolik

CONTINUED FROM PAGE 93

But it's going to do precious little to resolve the fundamental structural problems inherent in the U.S. economy. With a short-term windfall in tax revenue highly likely as older investments are cashed in, the greatest impact in all probability will be a reduction in pressure to deal with the enormous government budget deficit dragging down the economy.

For about two years, Uncle Sam's coffers will swell with previously unanticipated revenue, giving legislators and administrators the illusion that the government is functioning efficiently enough for . . . well, for government work.

The carrot President Bush is holding out to Congress is that the short-term gains on this tax change will result in new business, new jobs and additional tax revenue down the road. Unfortunately, as many a cynic would argue, what has often happened with such revisions is that much of the wealth goes into someone's pocket. But even that scenario is something we should be able to live with, because some part of the wealth is very likely to be put to use stoking our capitalist system.

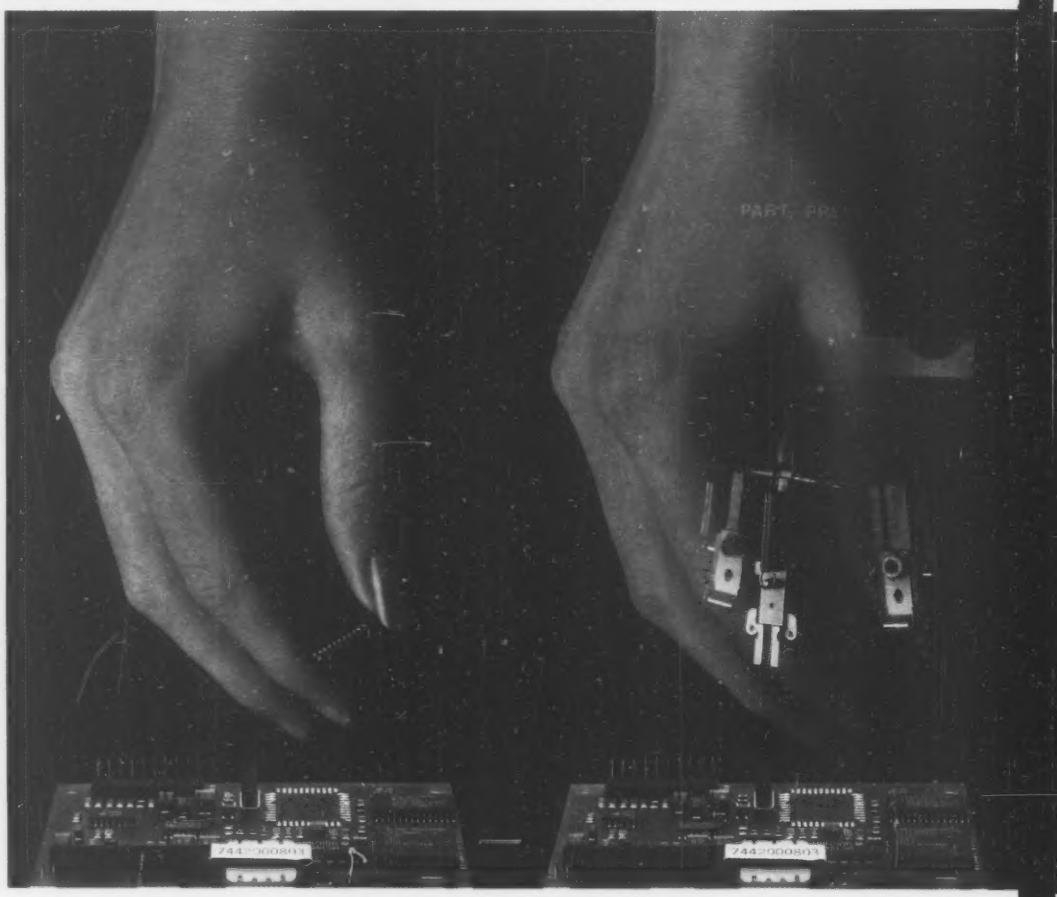
What we cannot live with is the greater prospect that this change will break the covenant that was struck with the Tax Reform Act of 1986 . With relatively little Machiavellian maneuvering, the special interests in Congress simplified what had become a ridiculously confusing tax code rife with loopholes.

If the Senate concurs with the House on this tax revision, how comfortable can we be that it will end there? Already, this tax change is being decried, somewhat justifiably, as a break for the already rich.

The trough has been pulled back into open view. And it is likely to set off a feeding frenzy as special interests, revived by the first crack in the tax covenant, set about slipping in all sorts of loopholes and tax incentives. Before you know it, we will be back where we were prior to tax simplification, or even further behind the eight ball.

The lessons of history teach us that complicated tax codes tend to benefit the haves. So, while the computer industry as a whole may benefit in the short term, it is highly likely that long-term benefits will accrue to the IBMs and General Motors of the world, at the expense of the garage start-ups.

Bartolik is *Computerworld's* news editor.



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Datapoint

CONTINUED FROM PAGE 93

Two weeks ago, Edelman sneered at Martin S. Ackerman's effort to unseat him by boosting his 10% stake in the firm to 40%. Ackerman countered last week by filing a lawsuit against Edelman, Datapoint, Intelogic Trace, Inc., Canal Capital Corp. and several other Edelman-controlled entities.

The suit alleges that Edelman and these affiliates improperly purchased $17 million worth of shares, or an approximately 30% stake in Datapoint, solely to thwart Ackerman's efforts to remove Edelman and his board of directors. It also claims that these companies admitted as much to the Securities Exchange Commission in filings. Ackerman cites this as a compelling reason to disqualify those shares from being voted in connection with his consent solicitation. Ironically, this is the route Edelman took in his 1985 takeover of Datapoint.

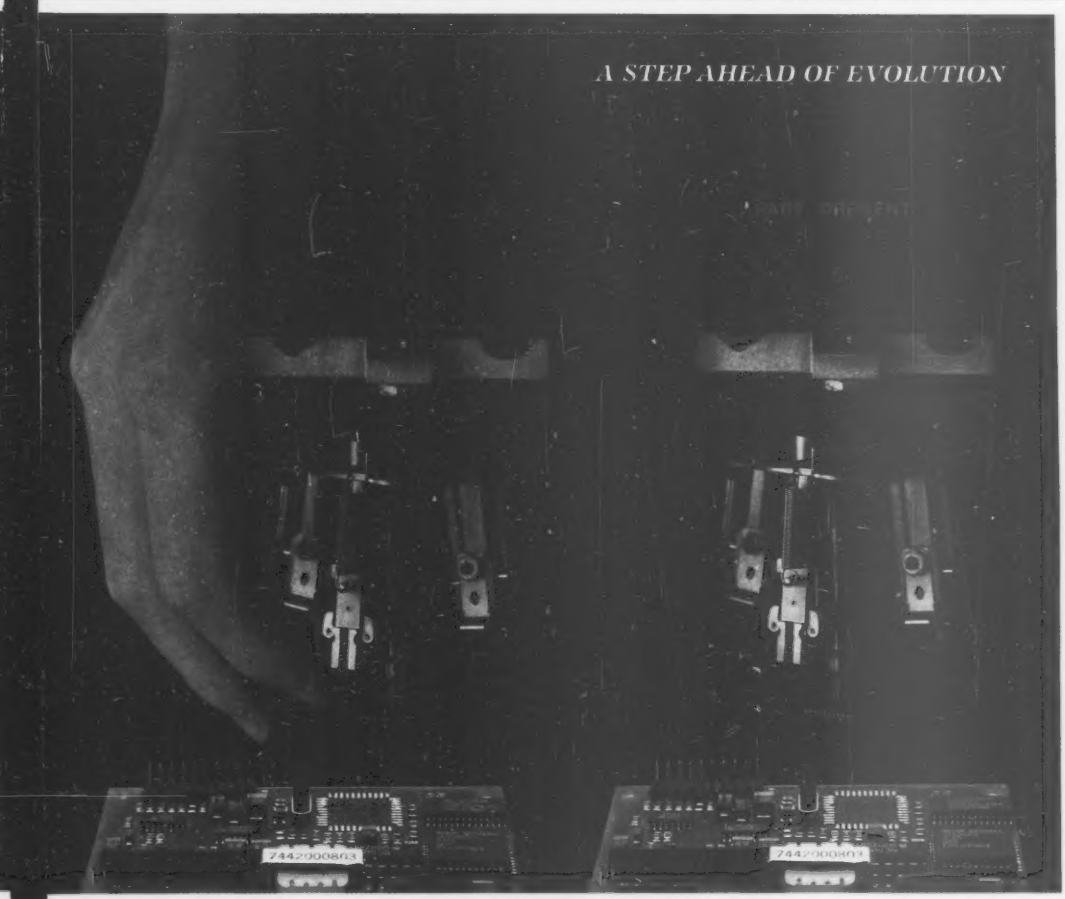
Also, news came last week of a net loss of $29.2 million on revenue of $312.5 million for Datapoint's fiscal year ended July 31. This compares with a net income of $8 million on revenue of $330.8 million for fiscal 1988, and it comes on the heels of a fourth-quarter loss of $8.9 million on revenue of $79 million.

A significant part of the loss was attributed to the cost of restructuring and redirecting the business. Consolidations and streamlining actions taken in the third quarter are anticipated to reduce operating costs by about $20 million annually.

Datapoint claimed that these and other "negative factors" are offset to a degree by the company's investment portfolio, which reportedly has recorded a gain of $3.3 million. The portfolio is handled by a group controlled by Edelman, from which he receives a commission. Ackerman blames Datapoint's losses partly on its propensity for awarding dividends to preferred shareholders, even at the cost of depleting the firm's profits. When pressed on this point, Michigami, who admitted he is not up to speed on company history, said it was his understanding that part of what management had tried to do in creating a preferred shareholder class was to obtain financing.

"Obviously, you can probably show a decrease in [the value] of the stock," Michigami said. "But you must take into account that the company was in serious financial trouble when Asher took over, and the company has had to pay dearly for many of the practices of past management."

Yet, Ackerman maintains that Datapoint's troubled financial condition is the direct result of Edelman's conflicts of interest. "This self dealing for Mr. Edelman's personal advantage goes to the very heart of the questions as to whether Mr. Edelman and his directors [who, Ackerman claims, all receive fees or salaries from entities controlled by or associated with Edelman] are qualified to exercise stewardship of Datapoint," he said.



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Aldus Corp. reported revenue of $20.9 million for the second quarter ended June 30, compared with $19.2 million in the like 1988 quarter. Net income for the quarter was $3.4 million, compared with $3.3 million for the same period a year ago.

Revenue and net earnings each increased 47% in fiscal 1989 for computer lessor **The Meridian Group.** The Deerfield, Ill.-based company reported revenue of $424 million for fiscal year 1989 ended June 30, compared to $288 million for the prior fiscal year. Net earnings for fiscal year 1989 were $16.4 million.

Concurrent Computer Corp. reported a fourth-quarter net loss of $600,000, compared with a net loss of $10.4 million in the previous year. Fourth-quarter results included a gain of $3.6 million from the sale of a 40% interest in the company's wholly owned Japanese subsidiary. Net sales for the quarter ended June 30 were $85.6 million, compared with $18.1 million in the prior year. Net loss for the year was $24.7 million compared with a net loss of $7.9 million in the prior year. Net sales for the year were $278 million compared with $76.5 million a year ago.

System Software Associates, Inc. reported net income of $3 million in its third quarter ended July 31, or $0.38 per share, up 90% from net income in 1988's third quarter. Revenue increased to $24.3 million, compared with $14.8 million in the third quarter of the prior year.

System Industries, Inc. announced revenue of $22.8 million for the fourth quarter ended July 22, a decrease of 33% from the $34 million reported for the fourth quarter in fiscal 1988. On this revenue, the company posted a net loss for the current quarter of $1.5 million, compared with net income of $25,000 for the comparable quarter in fiscal 1988. For fiscal 1989, the company had revenue of $101.1 million, a 25% decrease from the $134.1 million reported for fiscal 1988. The firm had a net loss on this revenue of $32.6 million.

3Com Corp. announced results for the first quarter ended Aug. 31. Net income was $1.2 million on sales of $89.1 million as compared with net income of $7.1 million on sales of $82 million during the same period a year ago.

Taking the job hunt on-line

Logging on can offer opportunities and is easier than knocking on doors

BY JANET RUHL
SPECIAL TO CW

If you are looking for a new job and want to try methods other than the tried-and-true techniques, you might consider on-line job hunting. An ever-changing selection of services are open to job seekers with access to a computer and modem.

These resources fall into two groups. One is bulletin board systems (BBS) dedicated solely to job hunting. They are either run for profit or maintained by headhunters who operate them in order to attract qualified job seekers. These dedicated BBSs often advertise in the classified sections of large daily newspapers or trade publications.

One such BBS is the Marlton Career Connection, which calls itself a "professional registry" and collects resumes from programmers, software engineers and systems managers. The menu-driven system prompts callers to fill in a detailed resume, with ample opportunity to elaborate on their qualifications. The board explains that "access to the registry is limited to subscribers" who are employers that pay for the privilege.

While the board promises not to send your resume to your current employer, a major flaw is that it is impossible to discover who owns and operates the board. Messages to the system operator fail to elicit this information. Users might be leery about entrusting their resumes to an unidentified source.

Name, rank and number

Other job-hunting BBSs are run by recruiters who clearly identify themselves as such. Super Resume, for example, is a BBS run by Lee Johnson International in San Francisco. The bulletin board is designed for software engineers but could be useful to any computer professional. It allows callers to scan a database of descriptions for jobs that Johnson International is attempting to fill, as well as files of job-hunting tips. The most useful feature may be one that helps the user compose an accomplishment-oriented resume either on-line or after downloading a file.

The on-line services that many job hunters seem more enthusiastic about are modules of large commercial networks. Many programmers and managers have found them to be an excellent way to make contacts with programmers, managers and small-business owners that eventually lead to satisfying jobs.

The programmer or systems manager who visits a special interest area of an on-line service such as Compuserve, Bix or Usenet can take part in discussions that are seen by up to 1,000 other participants. By getting involved in discussions on technical topics and solving problems that members post on these bulletin boards, programmers and managers can demonstrate their mastery of a technical specialty to all of these people — some of whom are in a position to hire.

> "I FOUND ONE of my top people on-line. I simply put up a message saying I was looking and interviewed the people who responded."
>
> RICHARD GROSSMAN
> TECH III

Because the majority of people who log on to the on-line services are microcomputer programmers, this avenue is most useful to people who work with DOS or Macintosh software. Companies looking for competent personal computer software specialists often post messages on these services, knowing that people with the expertise they need congregate there.

Smaller companies often recruit through these services. "I found one of my top people on-line," says Richard Grossman, president of Tech III, a San Pedro, Calif.-based PC consulting firm. "I simply put up a message saying I was looking and interviewed the people who responded."

Frank Cook, secretary and treasurer at Association Computer Services in Indianapolis, hired several consultants and a full-time employee who approached him on a Compuserve forum. Adam Wildavsky, a Macintosh software developer, says that as the manager of a software team for a start-up organization he hired several people via postings on Compuserve, Applelink and local networks.

Consultants find that spending money to make contacts on-line with strangers can often result in more work. Dbase consultant Martin Schiff found that answering a technical question on the Compuserve Ashton-Tate Corp. forum led to an offer to do over $10,000 worth of consulting.

On-line contacts can also lead to jobs for people who are not PC programmers. Kevin G. Barkés, a consultant and writer in Library, Pa., operates a public bulletin board system for leading-edge users in his specialty, Digital Equipment Corp. VAX systems. "Someone asks a question in a technical forum, a conversation starts, and the originator ends up hiring the responder," he says.

Unix programmers find the Usenet network of bulletin boards useful in making job-oriented contacts. Usenet carries job postings, and programmers have been known to use it to warn each other about employers to avoid. Occasionally, there are similar postings on Compuserve and other services.

For mainframe programmers and managers, there are no commonly accepted places to hang out on-line. However, a certain number of mainframe and midrange systems experts can be found in areas of Compuserve where discussions on systems analysis and development methodologies regularly take place, such as the Consult and CLM forums. The potential is there. Given the critical mass of PCs now being handed to mainframe people as computer-aided software engineering platforms, it is possible that mainframers will also begin to take more advantage of the on-line option to broaden their network of contacts.

Ruhl is a consultant programmer in Connecticut and author of *The Programmer's Survival Guide: Career Strategies for Computer Professionals.*

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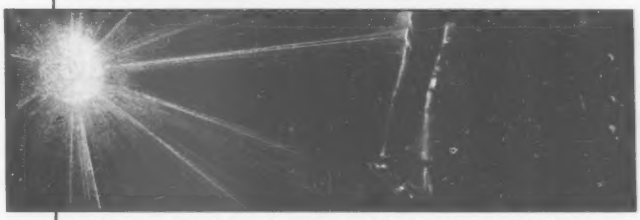

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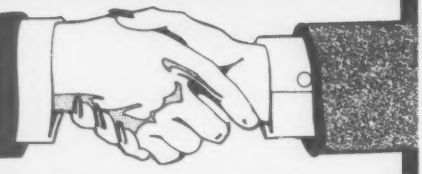

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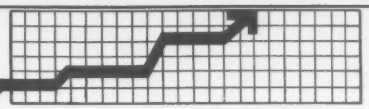

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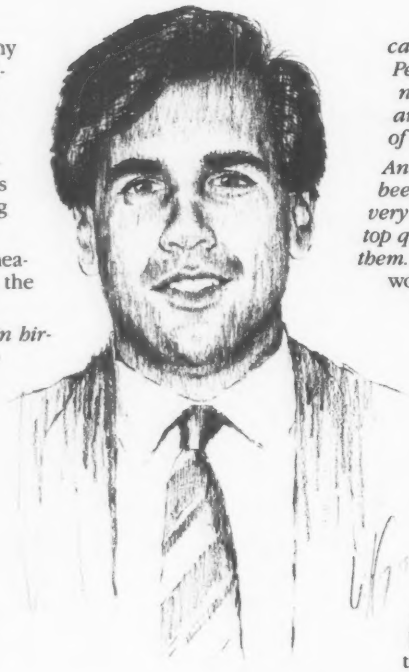

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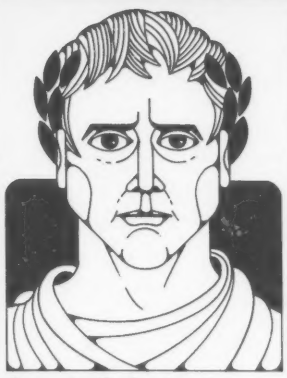

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data processing

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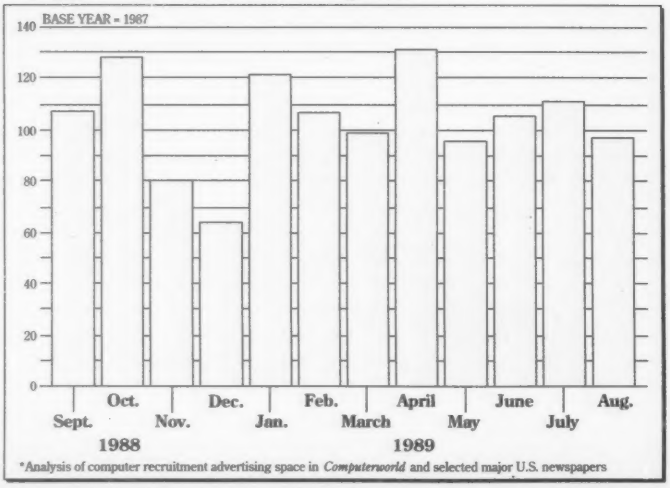
CAREER INDEX

Computer recruitment advertising index*



*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

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MARKETPLACE

Furor over software rentals

A U.S. subcommittee bill threatens the existence of the nascent industry

BY SIMSON L. GARFINKEL
SPECIAL TO CW

Imagine walking into a software rental store and going home with copies of Final Word, Microsoft Word, Wordperfect and Xywrite, just as you might leave a video store with *The Terminator* and *Videodrome*. You return the software packages in a week, paying perhaps $35, and go to a computer store to buy a copy of the one you liked best.

Now imagine a businessman away from home. He has five floppy disks' worth of Lotus Development Corp. 1-2-3 spreadsheets, but the office he is visiting uses Microsoft Corp.'s Excel. No problem. He goes to the local software rental store and checks out a copy of 1-2-3.

Such practices may not present any problems. However, the trouble with renting software, critics say, is that there is no assurance that customers will delete their copies of the programs. One of those critics is U.S. Sen. Orrin Hatch (R-Utah), who is is sponsoring an amendment to U.S. copyright law that would outlaw most rentals of software in the U.S. before the practice becomes widespread. Renting software is more common in Canada and Japan, according to a congressional committee staff member working with Hatch.

"The overwhelming rationale for renting a computer program is to make an unauthorized copy," Hatch said earlier this year. "Computer software cannot be enjoyed for an evening's entertainment and then returned. Unless Congress acts quickly, the embryonic rental industry could soon grow out of control, becoming a cancer that would kill off the legitimate software development industry by which it was created."

Hatch's bill, the Computer Software Rental Amendment Act of 1989, is based on the Record Rental Act of 1984, which eliminated the fledgling record rental business. The bill, which was approved by the Senate Subcommittee on Patents, Copyrights and Trademarks by a 5-to-1 vote July 26, would prohibit the renting, leasing or lending of software for commercial advantage without the copyright holder's consent.

Flak over infringement

The proposal drew heavy criticism from library groups, which claimed that the law would infringe on a library's right to freely collect and lend materials, and from video rental chains that rent software cartridges for home video games. The bill was subsequently amended to exempt both groups, and the modified version is scheduled for a vote by the Senate Committee on the Judiciary this fall.

> "THE OVERWHELMING RATIONALE for renting a computer program is to make an unauthorized copy."
>
> SEN. ORRIN HATCH (R-UTAH)

Everyone agrees that few organizations in the U.S. currently rent software as a business in its own right. "We think the problem is small right now. What we are trying to do is prevent it from growing," says Mary Jane Saunders, general counsel for the Software Publishers Association, a Washington, D.C.-based trade organization.

The most commonly rented programs in the U.S. are the MS-DOS and Apple Computer, Inc. Macintosh operating systems, which come with rented computers. PC renters contend that including the operating system software does not constitute a rental agreement. "We supply that software as a part of the rental, in the same context that we might supply a manual or a cable," says Rob Armstrong, manager of marketing for General Electric Rental/Lease in Atlanta.

Hatch's bill does not distinguish between renting applications and getting operating system software with a rented computer. The committee staff member says the issue was not considered in drafting the bill.

Corey Mason, president of Rent-A-Mac, a national chain, says that he rents Macintosh application software with computers but only to match competitors' services. He loses money in the process and would be happy to see Hatch's bill become law.

"I firmly believe that renting software as a profit center is wrong because it permits the dishonest user an opportunity to copy an expensive program at a very low cost," Mason says. Most individuals that rent applications from him, he adds, are businessmen who need a computer and programs for a week or so while traveling.

The Free Software Foundation, a Cambridge, Mass.-based group of computer professionals organized to promote access to software, sees Hatch's bill as one more step in the slow erosion of the public's traditional rights under the copyright law.

"The law that Hatch is pushing would do away with a public freedom that has existed since the beginning of copyright law: the freedom to borrow and lend," says Richard M. Stallman, a Unix programmer and consultant based in Cambridge and president of the foundation.

Stallman, who is trying to help form the League for Programming Freedom to combat what he calls monopolies over emerging software standards, says he is against any plan to increase the software makers' power over the public.

Garfinkel is a free-lance writer and computer consultant based in Cambridge, Mass.

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The BoCoEx index on used computers

Closing prices report for the week ending September 29, 1989

	Closing price	Recent high	Recent low
IBM PC Model 176	$475	$625	$400
XT Model 086	$725	$1,150	$700
XT Model 089	$1,025	$1,400	$950
AT Model 099	$1,475	$1,850	$1,400
AT Model 239	$1,700	$2,100	$1,700
AT Model 339	$1,750	$2,000	$1,700
PS/2 Model 50	$1,525	$1,725	$1,600
PS/2 Model 60	$2,700	$3,300	$2,500
Compaq Portable I	$550	$750	$325
Portable II	$1,700	$2,000	$1,650
Portable III	$2,450	$2,800	$2,200
Portable 286	$1,600	$2,000	$1,600
Plus	$750	$1,200	$675
Deskpro 286	$2,025	$2,350	$1,700
Deskpro 386	$2,750	$2,900	$2,500
Apple Macintosh 512	$550	$650	$300
512E	$600	$925	$600
Plus	$950	$1,150	$750
II	$3,025	$4,175	$2,500
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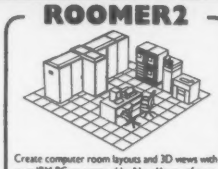

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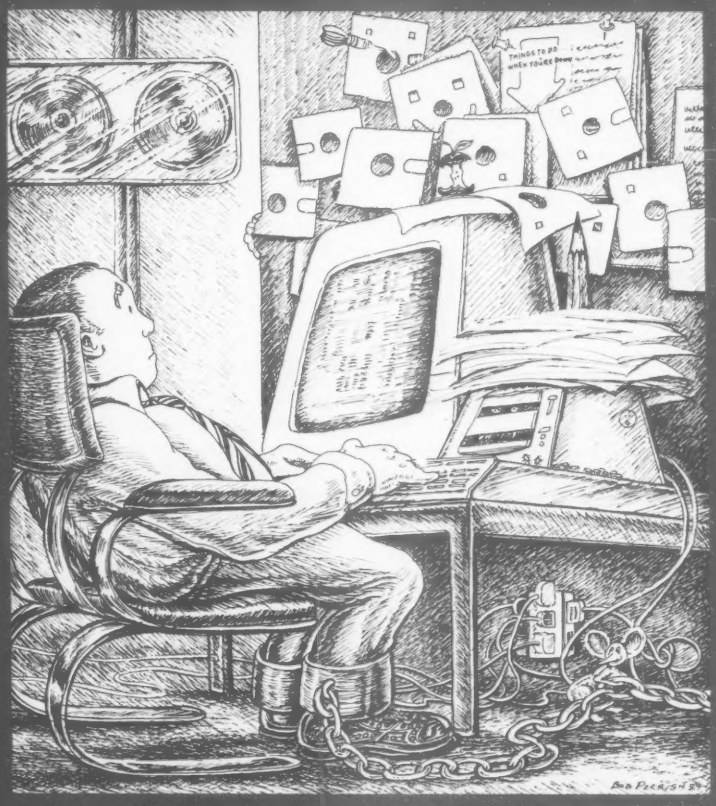

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IS pros as adjunct instructors

Systems staff members might coach or tutor, but shouldn't teach classes

Editor's note: Computerworld's Sept. 18 Training column dealt with the use of information systems staff members as trainers, mentors and coaches. This week's column takes a different view of this tactic.

BY BILL SEBRELL
SPECIAL TO CW

A unique phenomenon continually frustrates technical training managers in corporations: For some reason, nearly everyone — managers and supervisors in particular — feels that he is an expert in training. These people often freely express rather strong opinions — not only about the best ways to deliver training and who should deliver it, but about what the content of the courses ought to be.

Along with this sentiment there seems to be a compelling conviction that anyone who knows a technical topic and has the desire to do so can effectively teach people how to use the technology in question. Reality, however, contradicts this view. It is interesting to note that all state governments require some form of professional certification for school teachers. They also require teachers to evaluate students. It is a paradox that companies take the opposite approach. They require no instructor certification and let the students evaluate the teachers.

Fortunately, over time, the laws of natural selection work as a form of professional certification for corporate training people. As every training manager knows, but sometimes forgets, the delivery of a course is not an end in itself — it is just the means of making workers more productive and more capable. If instructors do not achieve that goal, it does not take long for the firm to get them out of teaching. By the same token, training vendors do not survive long unless they teach effectively.

For many years, corporations have sought to control training costs by finding volunteer, part-time instructors among their professional IS staff. The approach has not proved successful in the past, and the likelihood of future success is even more limited.

It is a false economy to use volunteer instructors from the professional IS staff to develop and deliver courses. The reason is that on average it takes about 13 days for a professional trainer to develop one day of instruction. This assumes a professional trainer with a good working knowledge of technology, an understanding of instructional design and solid presentation skills — which are considerably different than communication skills.

FOR MANY YEARS, corporations have sought to control training costs by finding volunteer, part-time instructors among their professional IS staff. The approach has not proved successful in the past, and the likelihood of future success is even more limited.

It takes a considerable chunk of time from the IS professional's primary responsibilities to learn how to teach and then to plan, develop and present a course. Even if there is a lot of time to do so, an individual may not develop effective courses or teach them properly.

Another reason to avoid using such adjunct instructors is that the largest portion of training costs is made up of the salaries of the students sitting in the classroom. It doesn't make economic sense to gamble on the delivery — the smaller portion of the expense — by using an untested volunteer over whom there are virtually no checks. After all, every training manager knows that it is what the students do with the training that is important. Hopefully, we have gotten beyond that old defense: "We taught those dummies — why didn't they learn?"

While it is really too expensive and too risky to use amateur instructors, there is a productive and beneficial place for the IS staff in training. They can sharpen their instructional skills by serving as coaches, tutors and mentors for entry-level technical people or other new hires.

Even in this type of role there are several significant caveats. The individuals must be carefully interviewed and selected. Good coaches tend to be superior communicators and great students of the game, but not necessarily great players. Just because super techies volunteer does not mean that they are qualifed.

These individuals also must be trained to fill their new roles, and someone must manage them. They should report what they do and do not do. Their performance should be measured and they should be rewarded for positive results.

Finally, there should be a well-defined limit to the role; adjunct trainers should not be able to use their additional duties as an excuse for not carrying out their primary responsibilities.

Within these limitations, using members of the IS staff as coaches, tutors or mentors presents minimal risk of damage and involves little in the way of costs — while the results, if difficult to measure, seem positive for everyone involved.

Sebrell is a vice-president at Data Base Management, Inc., a subsidiary of American Management Systems, Inc. in Manchester, Conn.

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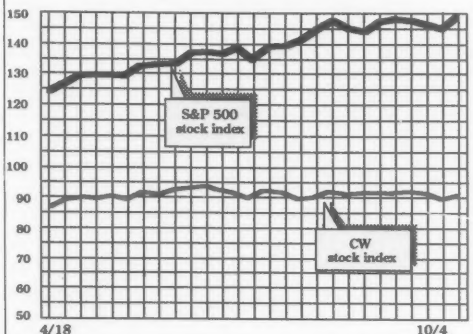

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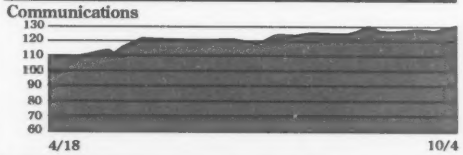

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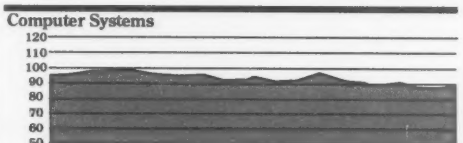

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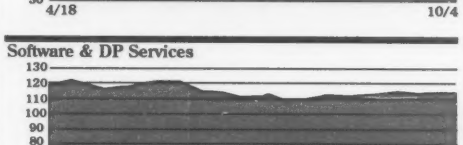

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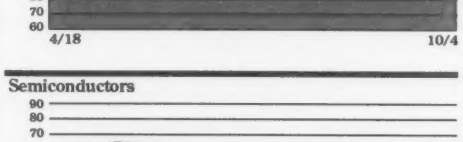
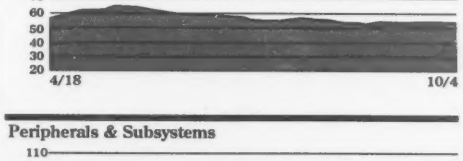
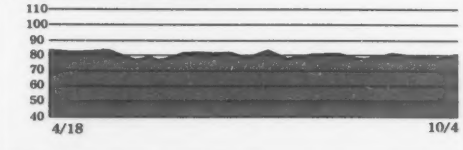


Peripherals & Subsystems



Leasing Companies



CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCT. 4, 1989

EXCH		52-WEEK RANGE		CLOSE OCT. 4, 1989	WEEK NET CHNGE	WEEK PCT CHNGE

Communications and Network Services

N	AMERICAN INFORMATION TECHS CORP	64	46	63.75	1.3	2.0
Q	ANDREW CORP	26	16	24.5	1.0	4.3
Q	ARTEL COMMUNICATION CORP	9	2	7.75	0.4	5.1
N	AT&T	45	26	44.75	1.8	4.1
Q	AVANTEK INC	7	4	6.125	0.3	4.3
N	AYDIN CORP	21	13	20.5	0.8	3.8
N	BELL ATLANTIC CORP	102	69	101.375	3.0	3.0
N	BELLSOUTH CORP	55	39	55.25	1.4	2.6
Q	COMPRESSION LABS INC	11	3	10	0.0	0.0
Q	COMPUTER NETWORK TECH	3	1	2.469	0.0	-1.3
Q	CONTEL CORP	35	18	34.625	1.6	4.9
Q	DATA SWITCH CORP	7	3	3.125	-0.1	-3.8
Q	DIGITAL COMM ASSOC	26	17	21	0.4	1.8
Q	DYNATECH CORP	21	17	19.5	0.0	0.0
Q	FIBRONICS INTERNATIONAL INC	7	3	5.75	0.0	0.0
Q	GANDALF TECHNOLOGIES	7	4	5.875	0.0	0.0
N	GENERAL DATACOMM INDS	7	4	6	0.1	2.1
N	GTE CORP	66	42	65.375	5.0	8.3
Q	INFOTRON SYS CORP	13	9	9.25	0.3	2.8
N	ITT CORP	65	48	63	2.9	4.8
N	M A COM INC	10	6	6.875	0.4	5.8
Q	MCI COMMUNICATIONS CORP	46	20	45.75	1.3	2.8
N	NETWORK EQUIPMENT TECH INC	28	14	27.5	2.4	9.5
Q	NETWORK SYS CORP	11	8	9.125	-0.3	-2.7
N	NORTHERN TELECOM LTD	23	14	21.75	0.8	3.6
Q	NOVELL INC	38	24	27.75	-0.5	-1.8
N	NYNEX CORP	84	65	82.75	2.9	3.6
N	PACIFIC TELESIS GROUP	47	29	45.625	0.8	1.7
A	PENRIL CORP	9	3	8	0.6	8.5
N	PLESSEY PLC	46	26	41.5	0.0	0.0
N	SCIENTIFIC ATLANTA INC	24	11	23.5	2.4	11.2
N	SOUTHWESTERN BELL CORP	58	39	57.5	1.6	2.9
Q	3 COM CORP	29	12	12.625	0.1	1.0
N	U S WEST INC	74	55	73.5	2.9	4.1

Computer Systems

Q	ALLIANT COMPUTER SYS	6	3	5.375	-0.3	-4.4
Q	ALPHA MICROSYSTEMS	8	5	6.75	0.3	3.8
Q	ALTOS COMPUTER SYS	9	6	8.875	0.1	1.9
A	AMDAHL CORP	23	13	13.375	-0.3	-1.8
Q	APPLE COMPUTER INC	50	34	44.25	-0.5	-1.1
N	BOLT BERANEK & NEWMAN	15	7	8	0.3	3.2
N	COMPAQ COMPUTER CORP	102	51	90.5	2.3	2.5
N	COMMODORE INTNL	20	9	9.125	-0.5	-5.2
Q	COMPUTER AUTOMATION INC	7	3	3.25	0.6	23.8
N	CONTROL DATA CORP	24	16	18.625	0.1	0.7
Q	CONVEX COMPUTER CORP	15	8	13.25	0.4	2.9
N	CRAY RESH INC	73	38	37.875	-4.6	-10.9
Q	DAISY SYS CORP	8	3	3.313	-0.2	-5.3
N	DATA GEN CORP	21	14	15	0.3	1.7
N	DATAPOINT CORP	6	3	5.375	-0.1	-2.3
Q	DELL COMPUTER CORP	13	7	7	0.0	0.0
N	DIGITAL EQUIP CORP	122	86	89.5	-4.1	-4.4
N	FLOATING POINT SYS INC	4	2	1.625	0.0	0.0
N	HARRIS CORP	38	25	37.75	0.8	2.0
N	HEWLETT PACKARD CO	62	48	49	-2.3	-4.4
N	HONEYWELL INC	92	57	83.875	1.5	1.8
N	IBM	131	106	108.25	-3.3	-2.9
Q	INFORMATION INTL INC	16	12	13.75	-0.1	-0.9
Q	IPL SYS INC	9	3	7.375	0.0	0.0
N	M/A/R/C INC	17	3	5.125	1.4	36.7
N	MATSUSHITA ELEC INDL LTD	204	158	164	-3.0	-1.8
Q	MENTOR GRAPHICS CORP	22	12	17.375	-0.9	-4.8
N	NBI INC	3	1	1.25	-0.3	-16.7
N	NCR CORP	67	51	59.25	1.0	1.7
N	PRIME COMPUTER INC	21	8	8.375	0.1	1.5
Q	PYRAMID TECHNOLOGY	20	9	16	2.3	16.4
Q	SEQUENT COMPUTER SYS INC	37	16	34.25	0.1	0.4
Q	SHAREBASE CORP	4	1	1.25	0.1	5.2
Q	SILICON GRAPHICS CORP	24	14	23.5	-0.5	-2.1
Q	STRATUS COMPUTER	35	21	24.875	-0.5	-2.0
Q	SUN MICROSYSTEM INC	23	13	17.25	1.6	10.4
Q	SYMBOLICS INC	3	1	1.563	0.1	4.2
N	TANDEM COMPUTERS INC	24	14	23.875	1.1	4.9
N	TANDY CORP	49	38	46.625	0.0	0.0
N	ULTIMATE CORP	12	7	10.125	1.1	12.5
N	UNISYS CORP	32	19	19.875	1.0	5.3
A	WANG LABS INC	11	5	4.75	-0.8	-13.6

Software & DP Services

Q	ADOBE SYS INC	30	14	16.12	-1.1	-6.4
Q	AMERICAN MANAGEMENT SYS INC	19	11	13.75	0.5	3.8
Q	AMERICAN SOFTWARE INC	20	9	18.625	0.8	4.2
N	ANACOMP INC	10	4	4.625	-0.3	-5.1
Q	ANALYSTS INTERNATIONAL CORP	20	7	19	0.5	2.7
Q	ASHTON TATE	27	10	10.375	-0.9	-7.8
Q	ASK COMPUTER SYS INC	18	8	8.75	-1.1	-11.4
N	AUTO DATA PROCESSING	49	36	48.125	2.5	5.5
Q	AUTODESK INC	42	23	40.5	1.8	4.5
Q	BMC SOFTWARE INC	25	8	24.875	2.8	12.4
N	BUSINESSLAND INC	15	10	9.75	-3.4	-25.7
Q	COGNOS INC	9	5	5.375	0.1	2.4
N	COMPUTER ASSOC INTL INC	22	13	16.375	0.1	0.8
Q	COMPUTER HORIZONS CORP	10	7	7.5	0.8	11.1
N	COMPUTER SCIENCES CORP	56	44	52.5	1.5	2.9
N	COMPUTER TASK GROUP INC	17	11	11	-0.1	-1.1
Q	COMSHARE INC	42	18	40.75	0.8	1.9
Q	CORPORATE SOFTWARE	16	9	9.5	-4.5	-32.1
N	GENERAL MTRS (CLS E)	56	39	52.875	-1.1	-2.1
Q	HOGAN SYS INC	7	4	5.25	0.0	0.0
Q	INFORMIX CORP	12	7	10.25	0.0	0.0
Q	INTELLICORP INC	5	3	4.75	0.1	2.7
Q	LEGENT CORP	31	17	29	1.5	5.5
Q	LOTUS DEV CORP	30	15	29.375	2.4	8.8
Q	MANAGEMENT SCI AMER	12	6	10.5	0.4	3.7
Q	MICROSOFT CORP	76	45	75.5	8.9	13.3
Q	NATIONAL DATA CORP	35	19	31.875	-2.6	-7.6
N	ON LINE SOFTWARE INTL INC	8	5	7.625	0.0	0.0
Q	ORACLE SYS CORP	24	7	24.375	1.8	7.7
N	PANSOPHIC SYS INC	18	12	15.125	-0.3	-1.6
Q	PHOENIX TECHNOLOGIES INC	19	4	3.875	-0.4	-8.8
Q	POLICY MANAGEMENT SYS CORP	37	22	34.25	0.8	2.2
Q	PROGRAMMING & SYS INC	20	13	19.5	0.5	2.6
Q	RELATIONAL TECH INC	16	8	8.625	0.0	0.0
N	REYNOLDS & REYNOLDS CO	34	20	26.25	0.1	0.5
Q	SAGE SOFTWARE INC	10	6	7.75	0.0	0.0
Q	SEI CORP	20	16	19.5	-0.1	-0.6
Q	SHARED MED SYS CORP	19	14	16.25	0.3	1.6
Q	SOFTWARE PUBG CORP	29	16	26	2.5	10.6
A	STERLING SOFTWARE INC	9	5	7.875	-0.1	-1.6
Q	SUNGARD DATA SYS INC	21	13	19.25	0.3	1.3
Q	SYSTEMATICS INC	36	26	37.25	1.3	3.5
N	SYSTEM CENTER INC	26	14	20.875	-0.4	-1.8
N	SYS. SOFT INC	30	13	26.25	-1.5	-5.4
Q	WORDSTAR	3	2	1.875	-0.2	-9.1

Semiconductors

N	ADV MICRO DEVICES INC	11	7	8.625	0.0	0.0
N	ANALOG DEVICES INC	13	10	9.75	0.0	0.0
Q	ANALOGIC CORP	11	7	10	-0.4	-3.6
Q	CHIPS & TECHNOLOGIES INC	26	11	19	-1.3	-6.2
Q	INTEL CORP	34	19	32.5	0.9	2.8
Q	MICRON TECHNOLOGY INC	26	12	12.625	-0.3	-1.9
N	MOTOROLA INC	62	36	58.75	0.9	1.5
N	NATL SEMICONDUCTOR	11	7	8.375	0.0	0.0
N	TEXAS INSTRS INC	47	35	38.375	0.0	0.0
A	WESTERN DIGITAL CORP	15	8	7.75	-0.5	-6.1

Peripherals

N	AMI INTL INC	6	5	5.75	0.3	4.5
Q	AST RESH INC	10	7	7.75	-0.6	-7.5
Q	BANCTEC INC	20	8	19.5	2.0	11.4
Q	CIPHER DATA PRODS INC	11	6	6.25	-0.4	-5.7
A	COGNITRONICS CORP	8	2	7.875	0.8	10.5
Q	CONNOR PERIPHERALS	15	7	13.375	1.0	8.1
A	DATAPRODUCTS CORP	18	9	9.75	0.1	1.3
A	DATARAM CORP	12	7	9.5	0.1	1.3
N	EASTMAN KODAK CO	52	42	48.75	2.0	4.3
N	E M C CORP MASS	6	3	4	0.1	3.2
Q	EMULEX CORP	12	6	6.75	0.0	0.0
Q	EVANS & SUTHERLAND	25	13	23.5	1.5	6.8
Q	ICOT CORP	3	1	1.5	-0.1	-7.7
Q	INTERLEAF INC	10	6	6.625	-0.4	-5.4
Q	IOMEGA CORP	5	2	2.625	-0.1	-4.5
Q	LEE DATA CORP	4	2	2.125	0.0	0.0
Q	MASSTOR SYS CORP	4	2	3	0.3	9.1
Q	MAXTOR CORP	12	6	11.5	0.3	2.2
Q	MICROPOLIS CORP	9	3	3.75	0.1	3.4
Q	MINISCRIBE CORP	9	1	1.438	0.1	4.6
N	MINNESOTA MNG & MFG CO	80	35	75.125	-0.1	-0.2
Q	PERSONAL COMP PRODUCTS INC	6	4	4.063	0.0	0.0
Q	PRIAM CORP	2	0	0.313	0.1	25.2
Q	PRINTRONIX INC	10	7	8.5	0.0	0.0
N	QMS INC	12	6	11.75	0.9	8.0
Q	QUANTUM CORP	16	4	14.5	-0.3	-1.7
N	RECOGNITION EQUIP INC	13	6	8.375	0.1	2.0
Q	REXON INC	8	6	7	-0.3	-3.4
Q	SEAGATE TECHNOLOGY	16	7	13.5	1.4	11.3
N	STORAGE TECH CORP	23	9	14.625	2.1	17.0
Q	TANDON CORP	2	0	1.063	0.0	0.0
N	TEKTRONIX INC	24	19	19.125	-0.1	-0.6
Q	TELEVIDEO SYS INC	1	0	0.531	-0.1	-15.0
N	XEROX CORP	69	54	65.875	0.9	1.3

Leasing Companies

Q	AMPLICON INC	115	11	12.75	-1.0	-7.3
N	CAPITAL ASSOC INTNL INC	9	5	7	0.3	3.7
N	COMDISCO INC	34	19	33	1.4	4.3
Q	CONTINENTAL INFO SYS	5	0	0.5	-0.1	-11.2
Q	LDI CORPORATION	19	13	18	0.3	1.4
Q	PHOENIX AMERN INC	5	3	3.875	0.1	1.6

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL

Inflamed

Apple, Intel, Oracle, Sun all benefit from hot market

Investors burned by technology stocks last week finally drove stock prices down into fire-sale figures, which ignited enough interest among bargain hunters to have tech stocks going like a house ablaze by the end of the week. Among the hotter issues, Apple Computer, Inc. picked up a point, closing Thursday at 45½; Intel Corp. climbed ⅜ of a point to a Thursday close at 33; Oracle Corp. added ⅜ of a point to 24; and Sun Microsystems, Inc. surged ahead 2¾ points. Sun closed Thursday at 18.

Microsoft Corp. went a long way toward reminding the market that the recent, much-noted instability of the industry also has its good side. The microcomputer software firm surprised analysts with a warning that revenue for its fourth quarter ended Sept. 30 is likely to surpass Wall Street expectations.

Microsoft stock rocketed 11⅛ points to reach a close Thursday at 79¼. Competitor Lotus Development Corp. closed at 29½, which is up 1 point from 28½ at the start of the week.

IBM closed Thursday at 107½, down 1¾ points from 109½ as the week began. Digital Equipment Corp. both began and ended the week at 91¼. In both DEC's and IBM's cases, however, the Thursday close figures were dramatic improvements from midweek dives.

NELL MARGOLIS

Survey says: Bigger budget, more CASE

BY ALAN J. RYAN
CW STAFF

NEW YORK — Computer-aided software engineering (CASE) tools are becoming more pervasive among larger corporations but are still predominantly used by companies that have large information systems budgets, according to a recent study by Touche Ross & Co.

The survey of 568 IS departments found that the average information services budget for companies using CASE was $47.7 million, while companies that are not using CASE have an information services budget of $16.8 million. Companies not using the tools also said the cost of CASE is the primary barrier to its implementation.

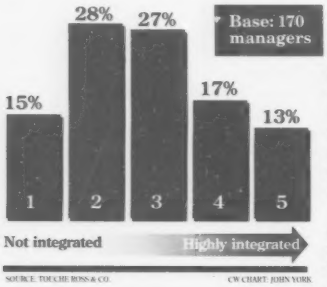
Among the respondents, nearly one-third said they had used CASE, and of those, most said they have used CASE for more than one year. The average experience rate of the respondents who did use CASE was two years.

Furthermore, one-fourth of the CASE users said their systems development staffs are larger than 180 people. Only 4% of the non-CASE respondents have staffs of a similar size, according to the survey.

Interestingly, organizations that have not implemented CASE report a lower annual turnover rate for the systems development staff than those who do use the tools. Those not using CASE also indicated that they expect their future turnover rates to increase at a slower rate than their CASE-using counterparts.

Not quite there

Only 13% of IS managers rate their CASE technology as highly integrated with their systems development methodology



SOURCE: TOUCHE ROSS & CO. CW CHART: JOHN YORK

The executives using CASE reported that the primary benefits of CASE would be higher quality systems and less or easier maintenance. Chief information officers said they do not expect project cost reductions as a result of using CASE.

At the recent *Business Week* executive program called The Information Executives Symposium, Cloene Goldsborough, director of data resource management at Trans World Airlines, Inc. in Kansas City, Mo., agreed that CASE tools can help cut costs. She said her group was able to cost-justify the expense of the technology by making a commitment that over time, it could bring about a 50% decrease in maintenance costs, as well as a 50% increase in development efforts.

"That was a conservative estimate," she said.

The Touche Ross survey also found that users in CASE organizations are more actively involved in all phases of the systems development life cycle than non-CASE users. TWA's Goldsborough concurred: "Prototyping is a good way to communicate with the users," she said. However, she admitted that at TWA, this was not done satisfactorily. "We still have questions on how exactly to do it," she said.

Companies responding to the survey also reported a moderate level of integration between their development methodology and CASE. Thirteen percent of the those who use CASE said it has been highly integrated, whereas 27.8% said it has been only slightly integrated. Another 15.4% said there has been no integration between development methodology and CASE.

DEC challenges IBM CASE strategy

Positioned against AD/Cycle, DEC's products will be available sooner

BY AMY CORTESE
CW STAFF

Digital Equipment Corp. took aim at IBM's software development strategy last week, with its own framework for computer-aided software engineering (CASE). Following on the heels of IBM's AD/Cycle announcement last month, the move is intended to present an alternative to the IBM approach.

DEC cited immediate or short-term availability of its tools — compared with mid-1990 deliveries for key AD/Cycle components — and stressed that its CASE tools can be used as the development environment for applications that would run on other vendors' hardware, including IBM's.

DEC filled out its CASE offerings with Decdesign, a new tool for analysis and design of software applications, and enhancements to some existing tools. It announced that about 20 third-party CASE vendors are supporting its CASE environment and introduced three product offerings from third parties.

In a broader sense, DEC laid out plans for evolving its CASE environment, most notably with an object-oriented interface to the CDD/Plus repository.

The interface, dubbed A Tools Integration Standard, or ATIS, will provide an integrated project support environment, DEC said. In IBM terms, ATIS is a software layer comparable to IBM's repository services.

The interface is based on technology licensed from Atherton Technology, Inc. and is expected to be available in the second quarter of 1990.

One of DEC's main thrusts was to communicate the "openness" of its environment. To that end, DEC has submitted ATIS to various standards organizations as a proposed standard for CASE repositories.

Support for others

The firm also emphasized that its CASE environment supports development of applications for non-DEC platforms, including Intel Corp. and Motorola, Inc.-based systems, IBM mainframes and Cray Research, Inc. supercomputers. However, all of the products center on VMS and the CDD/Plus data dictionary, which runs in that environment, leaving Ultrix-based development out of the picture for now.

Analysts concurred that DEC has been quietly successful in selling CASE software, estimating DEC's CASE-related revenue to be in the vicinity of $1 billion to $1.5 billion. Peter Kastner, a vice-president at Boston-based Aberdeen Group, pointed out that DEC has 80,000 CASE users worldwide. "This is a horse race, and DEC is literally lengths ahead," Kastner said.

Gig Graham, director of software services at Gartner Group, Inc., said that DEC has been successful in enlisting support from third parties and predicted it would be more so with ATIS.

Among the more than 20 DEC business partners, three new offerings were announced. Andersen Consulting, also an IBM CASE business partner, introduced a new implementation of Foundation, its CASE tool, for the VAX.

Additionally, D. Appleton Co. and I-Logix, Inc. have signed on with DEC as cooperative marketing partners in order to jointly market their respective CASE tools.

Users, meanwhile, were more cautious. Hyman Chansky, a program manager at the U.S. Census Bureau's Economic Program Division, said his division uses CDD/Plus extensively and is just starting to use the new Vaxset programming tools announced last week.

Although Chansky said DEC is moving in the right direction with its CASE strategy, he expressed skepticism about the benefits of computer-aided software engineering and the learning curve involved.

All-In-1

FROM PAGE 1

computer-aided software engineering environment (see story above). In addition, DEC will announce Decdecision, a decision support system for All-In-1, industry sources said.

DEC is also expected to announce plans to migrate All-In-1 to the distributed client/server environment defined by NAS, boosting the outmoded office information system toward the next wave of office automation, according to Steven Wendler, a program director at Stamford, Conn., research firm Gartner Group, Inc.

A DEC spokesman declined to comment on any of the expected announcements.

IBM's Officevision, DEC's NAS and Data General Corp.'s CEO Object Office are all part of a third generation of office information systems, which has emerged during the past year, Wendler said.

In contrast with second-generation systems, which require intelligent workstations to access the office automation host as dumb terminals, architectures such as NAS set up collaborative client/server relationships that conserve server processing power and allow more sophisticated information, such as compound documents, to be delivered to the desktop.

All-In-1 could endow NAS with some much-needed substance and credibility, industry sources said. Frank Paccione, vice-president of telecommunications at Bankers Trust, said the bank could be interested in using NAS as a way to "provide more cooperative processing" between departmental local-area networks used by business lines of the bank and applications supported by DEC VAXs.

DEC is also expected to announce its intention to provide NAS support for several additional industry standards, according to a DEC document obtained by *Computerworld*. These will include Edifact, the international electronic data interchange standard, CCITT X.400 electronic mail protocols, International Standards Organization's (ISO) SQL and ISO's Office Document Architecture/Office Document Interface Format.

This week's announcements do not address a long-standing user complaint about the lack of off-the-shelf NAS products, however. "To me what they're saying is, 'you pick and choose [among various system environments, protocols and services], and we'll provide APIs to make it seamless,'" Dzubeck said.

Politics of office strategy

Is more better? DEC's distributed office information architecture — which is expected to be enhanced with a new version of All-In-1 — encompasses far more than IBM's. But when it comes to implementing real functions on specific systems, DEC primarily offers users do-it-yourself kits.

NAS support

- Servers: VMS, Ultrix.
- Clients: VMS, Ultrix, MS-DOS, OS/2, Macintosh, dumb terminals (X Window System terminal to come later this year).
- Services: terminal, mail, file-sharing, windowing, compound documents, application control, forms, graphics, repository/dictionary, data access, print, data conversion.

Officevision support:

- Servers: OS/2, OS/400, VM, MVS.
- Clients: MS-DOS, OS/2, dumb terminals.
- Services: Electronic mail/directory, calendar/scheduling, distribution, libraries, searching.

SOURCES: GARTNER GROUP, INC. AND DIGITAL EQUIPMENT CORP.

DB2

FROM PAGE 1

Wait for Input transactions. Batch updates have a 20% improvement in CPU and elapsed time, IBM said.

One user noted that not all sites are likely to experience those optimal improvements. "There is always that statement at the bottom that this will not be true in all cases and even possibly be negative," said Dan Pizzica, assistant vice-president and head of the database unit at Mellon Bank NA in Pittsburgh.

Vince Hilly, director of data administration at Depository Trust Co. in New York, who is in the process of installing the new release under an early shipment, said that he is planning on testing IBM's performance assertions.

Depository Trust, purportedly the largest DB2 shop in the country, has about 650 DB2 tables and performs about 30 million SQL calls per day. "We are anxiously awaiting the performance improvements," he said. "If we get the improvements IBM claims, they will be very substantial."

The lion's share of the performance boosts are the result of changes in DB2's optimizer and in its indexing techniques, which can now use, for example, multiple indexes to access a single table.

Two sides to the story

Users welcomed the new query capabilities, but Pizzica said they could have negative implications in isolated situations, depending on the type and size of the table and the number of indexes.

Changes to DB2's optimizer — the mechanism that takes user-coded SQL and seeks the most efficient path for retrieving data — will have the greatest effect on organizations.

Not all of those changes will be positive. Given the complexity and large number and types of DB2 queries, "optimizer changes can improve, have no effect on or actually degrade performance of certain queries," said Colin White, president of Database Associates, a consultancy in Morgan Hill, Calif.

In addition, White said that when customers create queries that do not perform very well against former releases of DB2's optimizer, IBM in turn adjusts the problem and publicizes performance comparisons between a query's present and past performance.

"Not every customer is going to get eight or 10 times improvement unless they have that kind of query," White said.

Bob Venable, a systems programmer at Provident Life and Accident Insurance Co. in Chattanooga, Tenn., is concerned about the interplay between the organization's optimized-SQL code and the improvements to the optimizer.

"We are hoping that the results will be good," Venable said, "but it could result in retuning thousands of SQL calls for the optimizer, and we have been burned in performance by every release of DB2."

That sort of legwork with new optimizer releases is not unusual. "When we went from Version 1.3 to Version 2 about five months ago, we had about 2,000 DB2 programs in production and had to go through and rebind everything and compare the access paths that we had against what IBM had chosen for the new release," Hilly said.

Although Depository Trust has an automated process, they examined differences in access paths — what Hilly described as a labor-intensive but necessary process that took two months to complete.

"We have tables that are over 800 million rows, and we have things that do inquiries against those tables," he said. "God help us if the optimizer decides to do a table scan rather than an index scan, because the query wouldn't end for a couple of days." The company, he said, had been "burnt in the past."

486

FROM PAGE 1

over a 386-based version, said Rodger Einbecker, division director in corporate systems.

The University of New Mexico's School of Medicine is also testing IBM's Power Platform with some graphics and statistical applications. Performance rose by 50% to 150% after a cost increase of 25% was applied, said Prof. John Sobolewski. The more CPU-intensive the application, the greater the performance improvement, he added.

In Einbecker's case, a lone IBM 486 board has already proven its worth by allowing multiple runs, vs. just one run per day in an intensive computing application where turnaround is crucial. "It is absolutely saving us days worth of work."

Despite these testimonials, the server market is the most likely resting place for 486 machines, said Paul Leghart, a vice-president with Computer Technology Research Corp. and the author of a forthcoming report on the 486.

Wells Fargo will heed the siren call of high-octane servers promising increased processing and I/O, said Mar, who sees the 486 as the core technology around which networks will be built. Users may need to upgrade their disk drives to avoid bottlenecks.

Pricing is tricky. For users standardizing on the 386, the arrival of the 486 may be unsettling. By mid-1990, 486 prices should start dropping, kicking off a corresponding, and ordinarily welcome, drop in the cost of 386 boxes, particularly the 25-MHz and 33-MHz models.

However, by that point, the performance differential of the more reasonably priced 25-MHz 486 is expected to displace the high-end 386 boxes.

Despite the cost, the newer technology is well worth it — even for DOS users, argued Michael Slater, editor and publisher of the Palo Alto, Calif.-based "Microprocessor Report" newsletter.

"It *is* sort of pathetic to take a terribly crippled system software [DOS] and put it on a machine capable of doing so much more," he conceded. Yet Slater expects a lot of early 486 users will do just that.

They might as well. Microsoft Corp. will ship the developers kit for an 80386 version of OS/2 by year's end, but the company refuses to comment on delivery of the operating system to end users.

Applications that take advantage of a 32-bit data path will bring up the rear. This means users will not be able to fully exploit the 486's 32-bit processor unless they opt for Unix.

In the meantime, there are significant increases to be gained in sheer response time, whether running DOS or OS/2 applications.

"People like me spend a large part of their day in DOS applications where performance is limited," Slater said.

Simple reductions in response time of as little as five to three seconds can start saving him as much as a half an hour a day, he said. "So when I look at the price of a 486 on an annualized basis, it's not all that much."

Of course, some might tell Slater to migrate to OS/2. Yet like many other users, he has neither the time nor inclination at this point to learn a new system.

"I wouldn't consider a new machine unless I could transfer my learning curve, applications and data to it," Slater said. Because the 486 is backward-compatible with the 386, this is possible.

Head to head

Benchmark tests compare performance of a 25-MHz, 486-based Intel system against a 33-MHz, 386-based Compaq system

	Calculation-intensive task		Disk-intensive task		Normal task calculation and disk combination	
Number of copies running	*Winner*	*% difference*	*Winner*	*% difference*	*Winner*	*% difference*
2	Even	—	Even	—	Even	—
10	Even	—	386/33	175%	386/33	150%
16	Even	—	386/33	100%	486/125D	70%
34	386/33	50%	486/125D	116%	486/125D	127%
40	486/125D	50%	486/125D	118%	486/125D	122%

SOURCE: NEAL NELSON & ASSOCIATES — CW CHART: FRANK C. O'CONNELL

A slice of the pie just isn't enough

DB2, Version 2, Release 2 has brought distributed capabilities into the hands of users for the first time, but users and analysts said that their hands want to hold much more.

"The fact that we will be able to use distributed capabilities for the first time is significant, and we will be able to use it on a limited scale," said Dan Pizzica, assistant vice-president and head of the database unit at Mellon Bank NA in Pittsburgh.

The new release offers multisite reads of a DB2 database and single-site updates of a remote DB2 site. According to Norris van den Berg, IBM manager of data systems architecture and strategy, there are no constraints for read-only across mutiple sites, but for IMS, CICS, TSO and batch transactions, the sites cannot be remote.

Although one DB2 system can communicate with another, those communications are limited to inquiry transactions from CICS, according to Vince Hilly, director of data administration at Depository Trust Co., in New York, which has an early release.

Hilly said that although companies will not be able to update across two DB2 sites and functionality is not all there, IBM "has taken a step in the right direction."

Colin White, president of Database Associates, a consultancy in Morgan Hill, Calif., said that users had been anticipating the ability to ship a copy of a table to a remote site, called a snapshot. "Snapshots is one of the highest requirements that we have gotten from customers, and we are working on that very visibly right now. Announcement of future distributed enhancements —connectivity between OS/2 and DB2 — are all near term and snapshots will be right on the heels of that," van den Berg said.

Similarly, others anticipated IMS and DB2 coexistence — a process that would automatically update a DB2 database when a firm updates an IMS database. The feature, White said, would eliminate the need to send a copy of IMS data to a DB2 system for end-user processing.

"The process, called propagation, as well as the ability to have read-only SQL access to DL/1 data, are both very important and are very close to completion," van den Berg said. "These are very high on our list, and we will have some good news on those matters soon."

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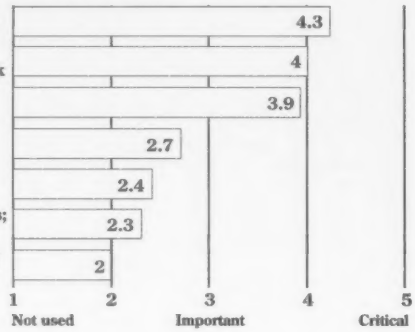
TRENDS

Software Support

Mainframe and mini software support can determine how productive users can become, and vendors are discovering some of their main competitors for this support are their customers themselves.

Nothing is more important to users than top-notch documentation.

How important are these support services to you?


• Quality documentation 4.3
• Phone support 8-12 hrs., 5 days/week 4
• Access to a guru 3.9
• On-site support 2.7
• System design and planning 2.4
• On-line bulletin boards; via software vendor 2.3
• Contract programming assistance 2
1 Not used
2
3 Important
4
5 Critical

Basic services such as telephone support and upgrades are preferred on an annual contract basis. Separate fees are chosen for more advanced, project-oriented support.

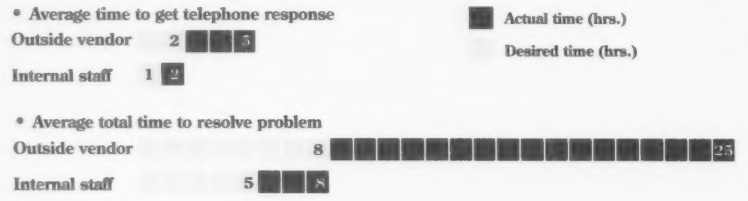
Contract preferences

Percent of respondents (base: 654)

	No need	Bundle	Annual contract	Per incident
• Basic telephone support	2%	24%	65%	9%
• Access to a guru	5%	17%	51%	27%
• Upgrades	2%	21%	69%	8%
• On-site technical support	22%	10%	38%	30%
• Advanced education/training	7%	10%	11%	72%
• Performance analysis/tuning	12%	13%	18%	57%

In-house staff beat vendors to the punch. The average response time for an outside vendor is almost three times longer than what their customers desire.

Phone response and problem resolution time


• Average time to get telephone response
Actual time (hrs.)
Desired time (hrs.)
Outside vendor 2 5
Internal staff 1 2
• Average total time to resolve problem
Outside vendor 8 25
Internal staff 5 8

SOURCE: THE LEDGEWAY GROUP, INC., LEXINGTON, MASS. CW CHART: JOHN YORK

NEXT WEEK

Du Pont Co.'s constant cross-pollination of employees and ideas, such as **Henry Morneau**'s recent job swap to head of scientific computing, helps keep the chemicals giant at the forefront of information systems innovation. A Manager's Journal story examines the changes at Du Pont since *Computerworld's* in-depth look at its IS strategy in May 1988.

KEN KAUFFMAN

Most applications now running on local-area networks are "LAN-ignorant" at worst and "LAN-aware" at best. What is really needed — and just beginning to appear — are "LAN-intrinsic applications" written to take full advantage of networked processing power. For a full description of this emerging breed, turn to Product Spotlight.

INSIDE LINES

Serving big chips

Observers expect Hewlett-Packard to unveil a 486-based desktop platform tomorrow that will probably incorporate an EISA bus and be capable of serving as a file server for Novell's Netware. For the coming-out party, HP has rented a suite in New York's Rockefeller Plaza and decorated it with luminaries from Microsoft, Intel and Novell, among others.

Ultramac, or Maclite?

With Apple's hefty 15-lb. portable less than three weeks old, talk is already circulating that NEC may be working with Apple on a slimmed-down version of the machine. NEC offers a variety of desktop and portable personal computers, including the Ultralite, which is the star of its portable stable, tipping the scales at a mere 4.4 lbs.

E-perfect?

Now that Wordperfect word processing software is available on a variety of hardware platforms, what's the next step for the folks at Utah-based Wordperfect? Electronic mail. Wordperfect President Alan C. Ashton told an investors conference in Baltimore last week that the company wants Wordperfect users to be able to send E-mail across different hardware platforms, using such interconnection standards as X.400 and the Government OSI Profile.

Virus? We don't need no stinking viruses!

Despite the turmoil within the computer profession over electronically transmitted viruses, the Federal Bureau of Investigation has not posted the crime on its most wanted list. "There is no question as to the issue of criminality of computer viruses, but it is not something that the FBI is specifically tracking per se," says Tony Adanski, supervisory special agent and unit chief of the financial crimes unit of the FBI. There have been "several investigations of computer viruses," according to Adanski, but he declined to elaborate on whether the FBI has stepped up its investigative activity. "It is difficult to allocate resources specifically to computer virus crimes given the broad range of computer-related crimes," Adanski said.

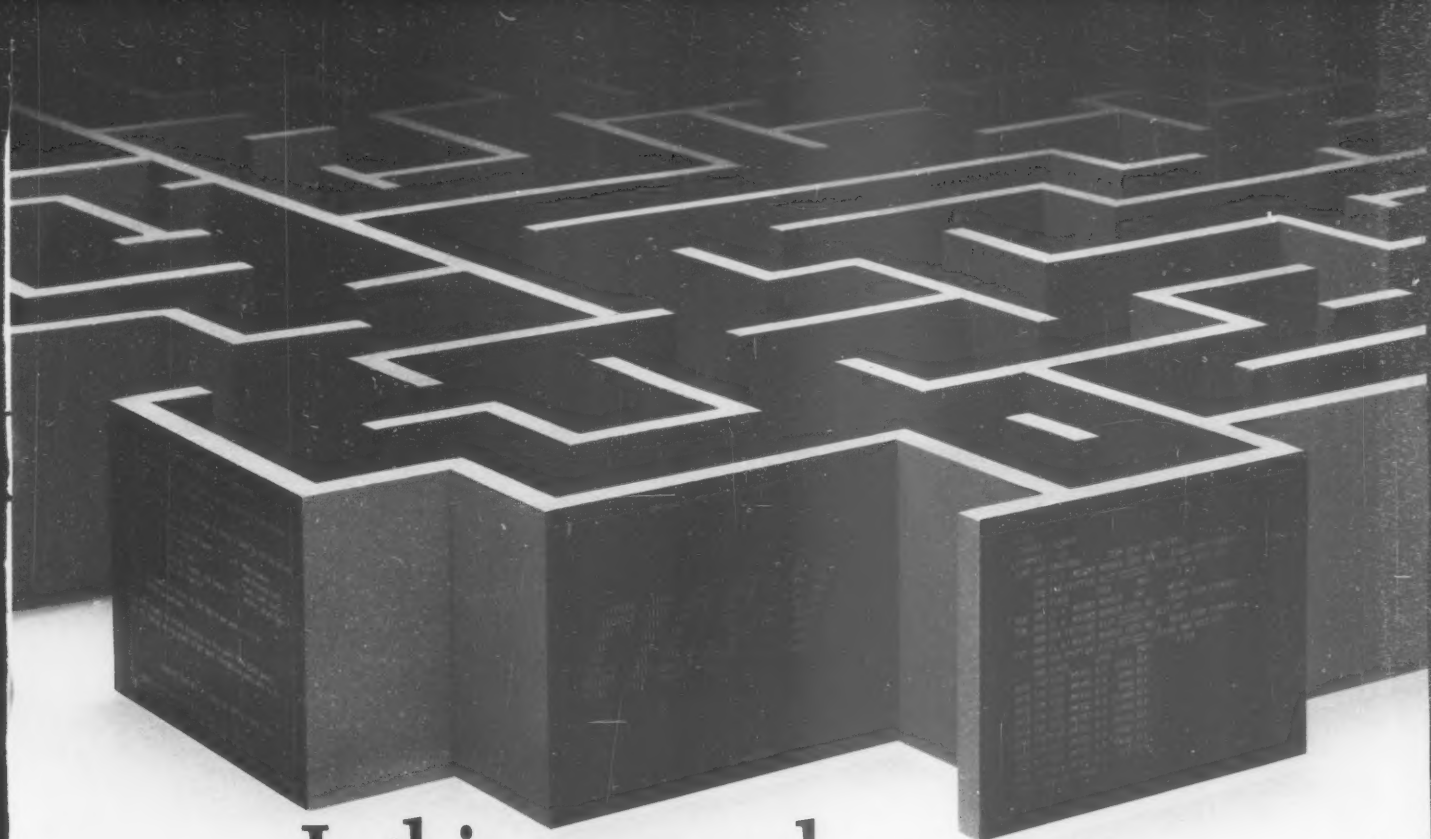
Spaceships among the spreadsheets?

Look for fully animated graphical interfaces that copy the interactivity of video games to debut on PCs in the next few years, predicted computer architects at NCR. In a white paper released last week, the architects said that thanks to Intel's 80486, the PCs of tomorrow will be able to learn how users work and anticipate their needs. In the gaming world of the 1990s, video jockeys have "no idea how the game's program operates . . . but see and sense all they need to know within a spatial context," predicted one architect. Instead, they are able to achieve a high degree of concentration, "which if mimicked in business applications would greatly enhance user productivity." With the right interface, the 486 will sell itself, the white paper's authors concluded.

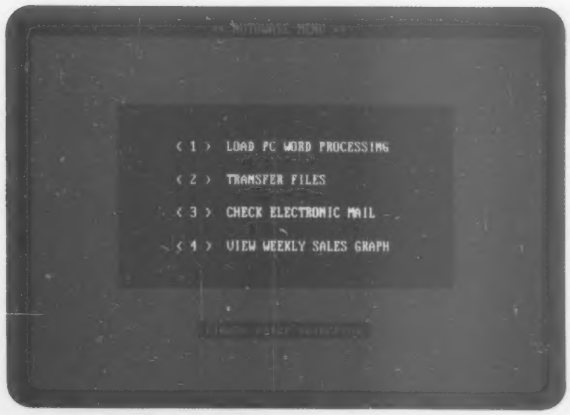
Write to what we say, not what we have

Sybase Executive Vice-President Bob Epstein remarked during a press conference last week that he expects to see a single processor server capable of 50 transactions per second released sometime this year. The IBM RT, perhaps? Wrong. A Sybase official later disclosed that despite a recent agreement to port to the RT, Sybase has not yet seen the next-generation machine that has taken on mythical proportions. But we will soon see the next Scalable Processor Architecture machine from Sun with that kind of power, he said.

AT&T has switched from using Roman numerals to Arabic numerals when filing its many Tariff 12 custom-network options for large business customers. When you consider that AT&T has boasted that it may file as many as 200 options, it could get a little unwieldy not to make the change. Option 138 would otherwise be Option CXXXVIII, and Option 149 would be CXLIX. Imagine if they used binary numbers? For your opinion on that and other weighty issues of the day, call News Editor Pete Bartolik at (1000 0 0) 11 100 11 - 110 100 111 100.



Is this your only route to mainframe information?



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1990
Computerworld Editorial Calendar
(January – June)

Issue Dates		Ad Closing Dates		Editorial Features			Trade Show Distribution	
Computerworld Issue	Computerworld Integration	Color (any)*	B/W Display	Special Features/ Executive Reports	Product Spotlights	Computerworld Integration	Computerworld	Computerworld Integration
Jan. 1		Dec. 8	Dec. 15	Forecast '90				
Jan. 8		Dec. 22	Dec. 29	Executive Report: The Dollars and Sense of Outsourcing				
Jan. 15		Dec. 29	Jan. 5	Executive Report: What IS Brings to the Food Industry				
Jan. 22**		Jan. 5	Jan. 12		Maintenance Providers			
Jan. 29		Jan. 12	Jan. 19	Executive Report: Advancing the Business Cause – Supporting Critical Adjustments				
Feb. 5**		Jan. 19	Jan. 26		User Review: Tools for Large Networks		Communication Networks	
Feb. 12		Jan. 26	Feb. 2	Executive Report: Partnering with Line Managers				
Feb. 19	✓ (Ad Close: Jan. 19)	Feb. 2	Feb. 9		Printers and Plotters	Managing Networks		
Feb. 26		Feb. 9	Feb. 16	Executive Report: Doing More for Less				
Mar. 5		Feb. 16	Feb. 23		User Review: DBMS			
Mar. 12		Feb. 23	Mar. 2	Executive Report: The View from User Departments				
Mar. 19**		Mar. 2	Mar. 9	Executive Report: Systems Integration				
Mar. 26		Mar. 9	Mar. 16		EDI Products and Services		DB Expo	
Apr. 2	✓ (Ad Close: Mar. 2)	Mar. 16	Mar. 23	Executive Report: Advancing the Business Cause – Better Manufacturability through IS		Integrating Voice and Data		
Apr. 9**		Mar. 23	Mar. 30		User Review: CASE			
Apr. 16		Mar. 30	Apr. 6	Executive Report: Outsider Information or What Consultants Know that You Can Use				
Apr. 23		Apr. 6	Apr. 13		Portable Computing			
Apr. 30		Apr. 13	Apr. 20	Executive Report: Advancing the Business Cause – Forging Connections with Suppliers and Business Partners				
May 7		Apr. 20	Apr. 27		User Review: Financial Software			
May 14		Apr. 27	May 4	Executive Report: IS in Financial Services				
May 21		May 4	May 11		Disaster Protection			
May 28***		May 11	May 18	Executive Report: Managing the Network				
June 4**	✓ (Ad Close: May 4)	May 18	May 25	Special Report: PCs Forging New Trails		Downsizing	Comdex Spring	Comdex Spring & PC Expo
June 11		May 25	June 1		User Review: Security Products and Services			
June 18		June 1	June 8		High Performance PCs		PC Expo	
June 25		June 8	June 15	Executive Report: Advancing the Business Cause – Making Information Fit to Use				

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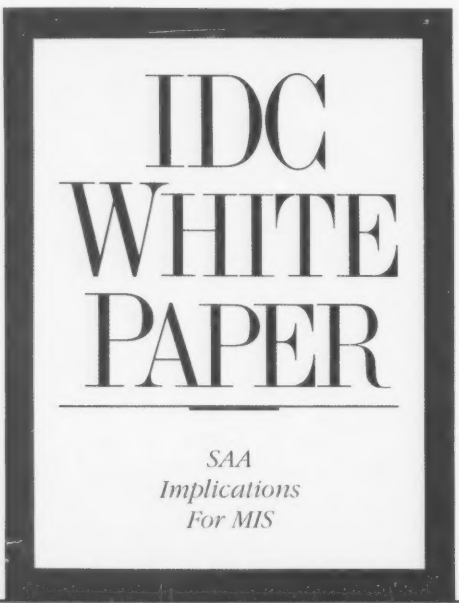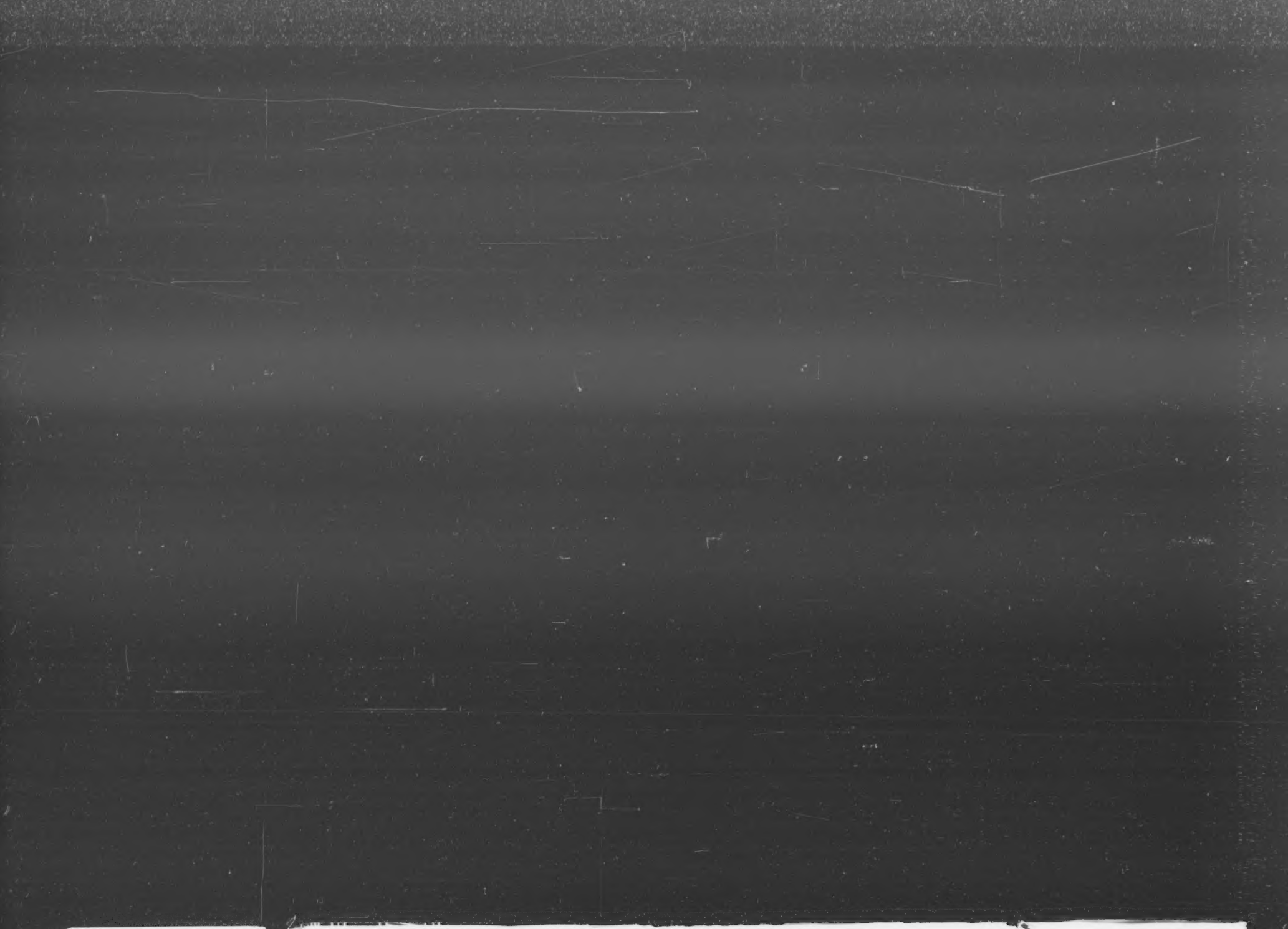
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